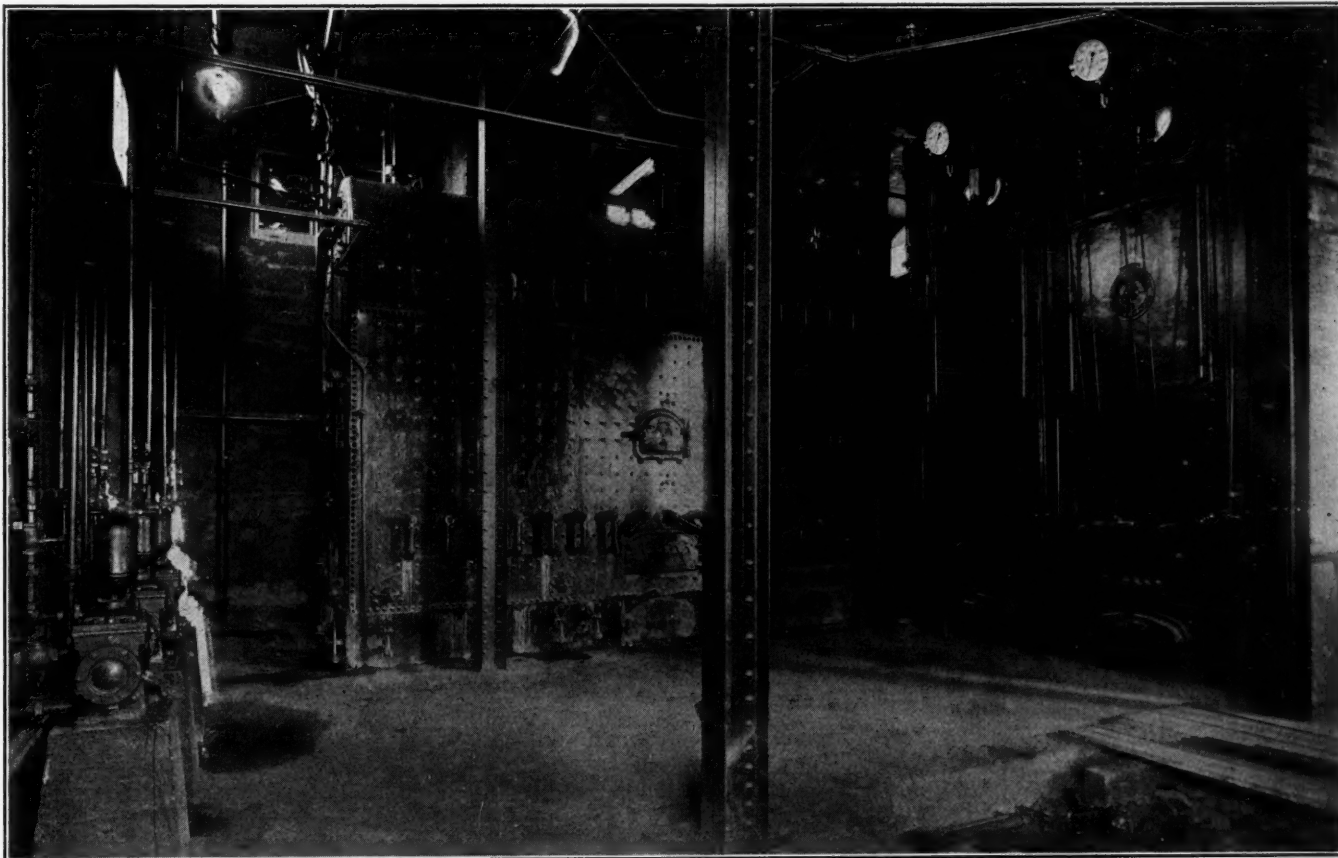


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INTERIOR VIEW, REGINA DESTRUCTOR PLANT, SHOWING NEW INCINERATOR, BOILERS AND FEED PUMPS.

REFUSE DISPOSAL IN REGINA

One Hundred and Ten Ton Plant for City Refuse, Including Large Amounts of Manure—Steam Boilers of Two Hundred Horsepower—Refuse Hauled by Street Railway from Loading Station.

In the early part of 1907 the city commission of Regina, Saskatchewan, contracted with the Decarie Incinerator Company for a 50-ton single unit plant for disposing of its refuse, which plant was at the time thought to be of ample size for several years to come. Like most of the cities in the Canadian northwest, however, the city has grown very rapidly, and in 1912 it was plainly evident that in a few months the capacity of the plant would be reached. Steps were immediately taken by the city commissioners, through Dr. M. R. Bow, the medical health officer, and J. A. Bertwistle, chief sanitary inspector, to prepare plans for the future disposal of the city's refuse.

In studying the problem, consideration was had of the fact that the city already had under construction additions to its two and a half million gallon sewage dis-

posal plant, which is located in the extreme northwest part of the city, on the banks of Wascana creek. Included in this plant were pumps for lifting the sewage, which it was proposed to operate electrically; and the question arose as to the practicability of utilizing heat from refuse incineration for operating the pumps. The incinerating plant already in operation had been giving good satisfaction, but no heat was being utilized by it. It was learned, however, that an incinerating plant built by the same company at Minneapolis had for some years been furnishing power which was utilized for lighting streets, and the advisability of securing power for the sewage pumps in a similar way was investigated.

The Decarie Company made a proposition to furnish such a plant with a capacity of 60 tons a day, to be installed at the sewage disposal works, which would pro-

vide heat for operating the pumps. It also seemed feasible to obtain heat for this purpose from the older plant, and it was finally decided to move the original 50-ton plant to the sewage disposal works and house the two plants in the same building, making in all a plant with a guaranteed capacity of 110 tons in 24 hours; there being provided two 100 horse-power Babcock and Wilcox water tube boilers, with forced and induced mechanical draught, for utilizing the heat from both incinerators. The contract price for constructing the new incinerating unit, moving the old unit to the new location and renovating it, and furnishing the boiler plant, was \$64,000, and such a contract was awarded on May 11, 1913, with a provision that the plant was to be completed within seven months from that date. The new unit was completed and commenced operation on December 1, ten days within the time limit. As the old plant could not be put out of commission until the new one was ready to operate, the renovating and moving of the older plant did not begin until after that date; but this work also has now just been completed, and the total capacity of 110 tons is now available.

The plant is located on the bank of Wascana creek in a building of concrete, brick and steel, having inside dimensions of 44x54 feet. Two sides of the ground floor of the building consist of concrete retaining walls, while the other walls are of brick. The hopper or charging floor is of reinforced concrete supported on steel beams. A standard gauge street car track, over which the refuse is delivered to the plant in special dump cars, passes through the building at the hopper floor level. The roof is of 3-inch concrete slab construction covered with tar and gravel roofing, supported on steel purlins and trusses. I beam trolley tracks are attached to the underside of the trusses over each unit, and chain blocks operate on these to raise the heavy cast iron hopper covers and also to handle carcasses brought to the plant for destruction. The incinerating furnaces and boilers and all the other necessary machinery are located on the lower or operating floor.

The chimney is 5 feet in diameter at the top and 125 feet high, and is of radial brick construction with an octagonal base of common brick set on a heavy concrete foundation just outside the building. On the operating floor there is also a men's room containing washstands, lockers, toilets and other modern conveniences.

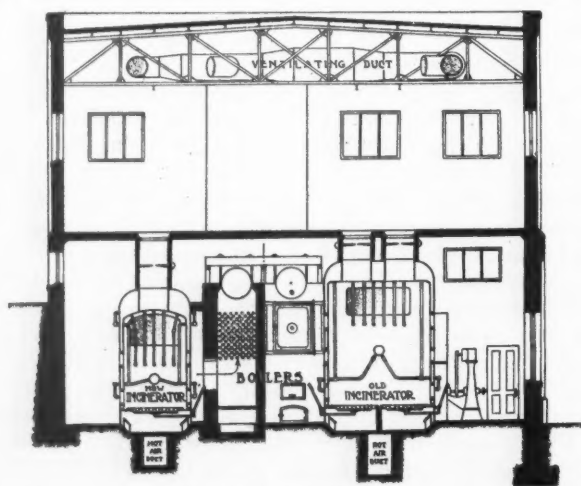
As the incinerator was some distance from the centre of the city, a loading station was erected near the site of the street car barns, at which the collection wagons deliver their refuse into dump cars. This loading station is a brick and reinforced concrete building two stories high with dimensions of 46x146 feet, and cost the city \$16,000. A siding of the municipal street railway

runs through the building at ground level, and onto this are run 5-yard steel dump cars especially designed for transporting refuse. The loaded collection wagons reach the second floor by means of an approach or ramp at the end of the building and dump their contents directly into the cars. A train of these cars have capacity for holding an entire collection for one day under present conditions, and the cars accordingly make but one trip a day to the incinerating plant. There is also provided a stable constructed of brick and provided with single stalls for 32 teams, and also with 4 box stalls, the cost of this being \$23,000. The collection wagons are housed under the second floor of the loading station.

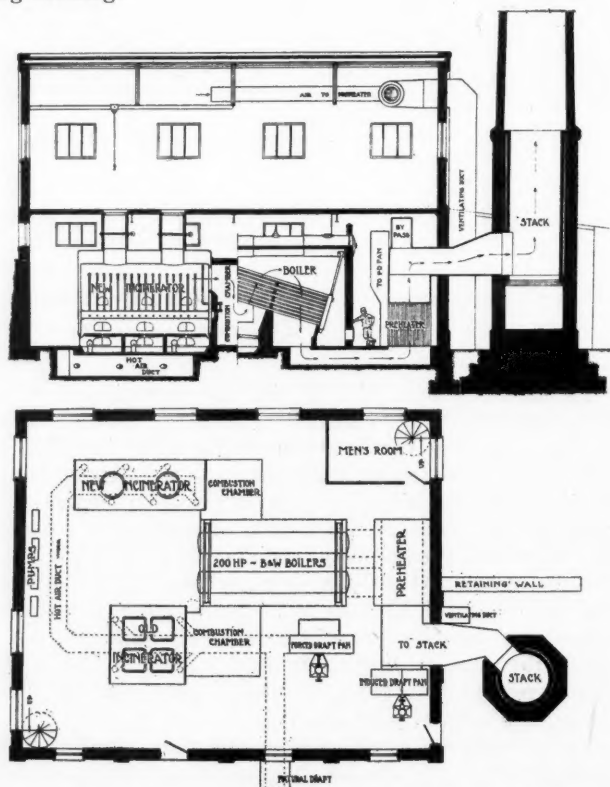
DESCRIPTION OF THE INCINERATORS.

The incinerator built in 1907 was of the steel water jacketed type, 10 feet square by 12 feet 6 inches high inside dimensions, with a 4-inch water space on all four sides, and with a 2-foot steam and water space above the crown sheet. Along two sides of the furnace were placed 1½-inch extra heavy pipes connected to the crown sheet at the top and to the fire box sheets at the bottom. These pipes were spaced 9 inches centres and bent so as to form a basket grate to receive the refuse, which was charged in from wagons on the floor above through four 3-foot square hopper openings in the crown sheet. This basket grate held the refuse about 3 feet above the lower or cast iron shaking grates, on which the material was finally consumed, giving the fire free access to all parts of the newly charged material without obstructing the draught or deadening the fire on the grates below. Only natural draught was used, which was furnished by a steel stack 135 feet high by 4 feet diameter at the top.

The new incinerator is of the same water jacketed type, but was made longer and narrower than the older unit, being 6 feet wide by 18 feet long by 10 feet high, inside dimensions. It has 4-inch water legs and a 2-foot steam and water space above the crown sheet. These proportions materially reduce the labor required for stoking and the number of stoking doors, and thus the amount of cold air which is drawn into the furnace during stoking.



BROKEN CROSS SECTION.



PLAN AND LONGITUDINAL BROKEN SECTION.

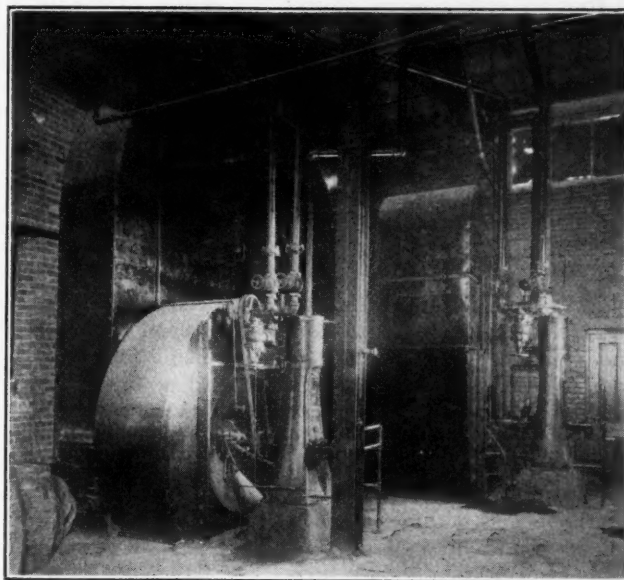
A longitudinal header connects the two end water spaces, and into this all the 2-inch basket pipes are connected at their lower ends. This header is made of 12-inch extra heavy pipe in the new incinerator and 8-inch in the old one. The pipes forming the basket grate do not connect into the inside plates, but come through the water leg, and by means of union tees and elbows connect into the outside sheets. This arrangement enables these pipes to be cleaned by removing plugs located in the tees.

Each incinerator has connected with it a combustion chamber and a 100 horse-power boiler. A pre-heater or generator for heating the forced draught is located between the boilers and the chimney. An American Blower Company's induced draught fan direct connected to an 11"x8" automatic high speed self-oiling steam engine is provided, and also an American Blower Company's forced draught fan, direct connected to a 9"x7" steam engine of similar construction. Four 5½"x3½"x6 March feed pumps are provided, one for each incinerator and one for each boiler.

Each unit is provided with a by-pass direct from its combustion chamber to the chimney, thereby enabling the boilers and pre-heater to be entirely cut out in case repairs should be necessary; or, if occasion should arise, the boilers and incinerators can be operated entirely independent of each other.

The boilers are installed to work at 126 pounds pressure per square inch, at which pressure they will be used for generating electric current for the sewage pumps. The generators have not yet been installed, but probably will be in the near future. Regular coal grates are furnished with the boilers for use if necessary. The blowoffs from the incinerators lead into their respective combustion chambers, and those from the boilers lead to the atmosphere through a 5-inch pipe. The exhausts from the pumps and fan engines pass through a 6-inch pipe directly into the base of the chimney. There are drain connections to the sewer, and water and steam

and the incineration completed on the shaking grates directly beneath. The gases pass into a brick-lined steel cased combustion chamber, where they are thoroughly mixed and burned before entering the boilers through the side wall directly over the boiler grates. From here the hot gases pass through the water tube boilers, thence under the floor and up through the pre-heater or generator and thence up the chimney; or they may be drawn through the induced draught fan to the chimney,



FORCED DRAFT PLANT.

as conditions may require. In case the heat from the incinerator is not sufficient, the boilers can be operated simultaneously with the incinerator gases and with the coal fire, since the former pass directly over the coal grate. It is not anticipated that coal fires will be necessary, however, except in wet weather or when the heat value of the refuse is exceptionally low.

The one pre-heater with its induced draught fan serves for both units, or for either one when only one is in operation. It contains 740 2½" boiler tubes expanded into ¾" steel plate heads. The gases pass through these tubes on their way to the stack. The air supply for the forced draught fan is taken in through a duct which leads from the ceiling of the upper floor to the pre-heater, and thus removes the foul air which rises toward the roof and produces a ventilation of the building. This air, in being drawn through the pre-heater, is raised to a temperature of from 150 degrees to 400 degrees Fahrenheit, and is forced by the forced draught fan through concrete ducts below the floor to the ash pits of the two incinerators. It enters the ash pits directly under the grates through suitable controlled nozzles at a maximum pressure of 4½ inches. The ash pit of each incinerator is divided into sections so that the forced draught can be shut off entirely, or in any one section, and the fire cleaned on that section of the grate without hindering the operation of the other grate sections. This hot forced draught has proved to be one of the most essential features in the burning of manure and saving of additional fuel. In case only natural draught is used, as in starting up when the steam pressure is down, an opening is provided to the outside of the building so that air can be drawn directly into the ash pit, thereby removing the necessity of opening the ash pit doors.

The incinerators are designed to operate at 100 pounds steam pressure, but in the continuous operation of the plant as a steam generating station, each incinerator



BUILDING OF REGINA DESTRUCTOR.

connections are provided on the operating floor for keeping the cars and the floor in a sanitary condition.

All material as it is delivered to the plant is dumped directly into the furnaces from the cars without any storage of the same. It passes through balanced doors in the brick-lined hoppers and drops into the basket grate. It is dried out and partly burned in this grate,

operates as a feed water heater for its respective boiler, the fans being operated by the steam from the boilers. The piping is so arranged, however, that in starting up the plant, or when the boilers are shut down, the incinerators can furnish the necessary steam for the fans and boilers.

The contract required that the new unit "should have a capacity of incinerating 60 tons of refuse in 24 hours, and the old unit, after being remodelled and installed in the new plant, should have a capacity of incinerating 50 tons of refuse in 24 hours; the refuse to consist of kitchen garbage, combustible material, manure and dead animals mixed together in proportions as created by the city of Regina from day to day, no attention being paid as to the selection of any particular kind of refuse or garbage; it being understood that manure would constitute 60 per cent. of the refuse to be destroyed.

"All material delivered to the incinerator will be destroyed without creating any noxious odors or gases.

"The total cost of operation will not exceed 65 cents per ton, and if credit should be given for power developed by the boilers at the rate of 70 cents per thousand pounds of steam, the cost would be reduced by one-half; and if 30 per cent. of the total refuse should be dry combustible, the addition of fuel would be unnecessary."

Owing to the large percentage of manure to be handled, the guaranteed cost of operation was somewhat higher than that given by the same manufacturers for plants, but the operating cost as determined by the test kept well within this cost. The company had guaranteed for the old plant an operating cost of 50 cents a ton, and it is said that during the five years of operation the cost had averaged only 30 cents, but no such percentage of manure was handled as was required for the new plant. In fact, in the old plant the city had difficulty in consuming the manure without additional fuel, as this plant was not equipped with any mechanical draught.

It was agreed by the city that a test of the capacity of the 60-ton unit only would be considered to determine the fulfillment of the guarantees, as the city could not, without great inconvenience, supply more than 60 tons of refuse in 24 hours. Three tests of the new plant were made—on December 1, December 12 and January 7. The first test was made under the supervision of the builders, the second with the regular city crew operating the plant. It had been desired to burn

refuse containing 60 per cent of manure in this second test, but this amount of manure was not available on that date. On January 7 the required amount was obtained, however, and the third test was run chiefly to determine the efficiency when burning this amount.

FIRE HAZARD FROM INCINERATORS.

Owing probably to complaints that the city garbage incinerating plant of Galveston, Texas, was greatly increasing the danger from fire to surrounding property, an engineer of the National Board of Fire Underwriters visited that city about the first of April. He reports finding the incinerator in a 2-story iron-clad frame building, the furnace being of concrete with a concrete stack and combustion being augmented by oil burners. The chimney is equipped with a spark arrester, but "the plant has proved to be not well designed to eliminate the fire hazard. The nearest exposure is a cotton platform 250 feet to the east, where several minor fires, caused presumably by sparks from the incinerator, have been put out with a bucket of water by the watchman. These fires were probably due to the poor condition of the spark arrester, the screen of which is rapidly deteriorated by the fumes.

"Several incinerators used by private parties to burn trash have in times past been so operated that they menaced surrounding property." A list of these includes private plants for burning refuse from a cooperage works, another for waste from the Santa Fe railroad office, and another for refuse from a stave mill.

The city of Galveston is considering the construction of a modern incinerating plant, and the engineer of the Board of Fire Underwriters, Mr. Goldsmith, states "it is believed from knowledge gained by the inspection of a newly-erected plant in Atlanta, Ga., and of the conditions under which other modern plants are operated, that a properly designed and constructed plant, which gives complete combustion and provides for safe disposal of the clinker, will introduce no hazard at the proposed location."

GEOGRAPHICAL STREET NAMING.

Editor, Municipal Journal,
New York City.

Dear Sir:—

It is suggested that a new system for naming new subdivisions and the renaming of streets and avenues is to use the names of the states in the order in which they lie geographically for streets running approximately north and south, giving the easternmost street the name of an Atlantic seaboard state, and naming successive streets in the order in which they lie geographically toward the west. This order could be taught to the school children, and any person on the street asking a youngster for direction if he was not familiar with the system, would be answered instantaneously that the avenues run the same as the location of states from east to west, and it will then be an easy matter for him to know just how many streets away his destination is. The general system could be carried out in the same way in each city that is willing to adopt this method for certain districts. After reaching the Pacific in this progression, start back again at the Atlantic on another tier of states.

This system could be elaborated by using the capital cities of the states for streets running in the other direction, these also succeeding each other in accordance with the geographical position of the states. I consider that this would be a great lesson in geography, and that it would be much more dignified to give a location as Virginia avenue and Richmond street than at the corner of Smith and Brown streets, especially for residential districts. Later on I will furnish you with a simplified method of house numbering, which is inexpensive and will positively avoid the awakening of citizens by strangers to ask the location of some specified number.

Yours very truly,

W. H. STEWART.

Results of Tests of 60-Ton Decarie Incinerator.

	Date of test—		
	Dec. 1.	Dec. 12.	Jan. 7-8.
Duration of test, hours.....	22	9.5	19
Material incin- erated, lbs....	Manure 57,240	23,310	74,100
	Garbage 55,480	.....	.....
	Fruit 2,800	.....	.....
	Fish 3,500	.....	.....
	Horses 1,500	.....	.....
	Garbage & refuse	24,460	48,870
Total amount of material destroyed, tons.....	60.26	23.89	61.49
Percentage of manure.....	47.5	48.8	60.3
Percentage of ash.....	10.0	10.0	10.0
Refuse burned per hour, tons....	2.74	2.51	3.24
Equivalent incineration in 24 hours, tons	65.76	60.24	77.76
Equivalent incineration per sq. ft. of grate per hour, pounds.....	50.7	46.5	60.0
Labor { Engineer, 50c. per hr..	\$11.00	\$4.75	\$9.50
	Firemen, 25c. per hr.*	\$19.80	\$7.12
Labor cost per ton, cents.....	51.1	49.7	30.9
Fuel required { Coal at \$10 a ton.	\$1.00	.....	\$1.00
	Wood at \$8 a cord	\$2.00	\$0.50
Fuel cost per ton of refuse, cents.	4.9	2.1	8.1
Total cost of operation per ton of refuse	\$0.56	\$0.518	\$0.39

NOTE.—The grate area in each test was 108 square feet.
*30 cents was charged for the firemen used in the first test.

STREET RAILWAY SPRINKLING

Legal Decisions as to Authority of Municipalities to Compel Street Railway Companies to Sprinkle Their Right of Way.

By J. SIMPSON.

The legal question has several times arisen whether a municipal corporation has authority to enact an ordinance to compel street railway companies operating cars within its limits to sprinkle their tracks, and also whether the particular ordinance in question is reasonable or so unreasonable as to be void. Generally speaking, it has been decided that such an ordinance must be specific, not burdensome, and confined to the companies' tracks; though, in one case, in Massachusetts, under the statutory powers conferred upon the municipal authority, an ordinance requiring sprinkling from curb to curb was sustained. In that case the Massachusetts Supreme Court enforced a requirement in a grant of location by the selectmen of Dedham, Mass., to a street railway company to the following effect: "Said Company shall water said High street from curb to curb between the 15th day of April and the 15th day of November in each year from Memorial Square to the point south of Lowder and High streets where paving ceases, as herein prescribed; such watering shall be done to the satisfaction of the superintendent of streets." Chief Justice Holmes, who wrote the opinion, said: "The requirement in § 23 of the grant of the location to the respondent that it shall water the street over a portion of the way between certain dates was a lawful restriction within Pub. Sts. c. 113, § 7, which allowed selectmen to grant a location 'under such restrictions as they deem the interests of the public may require.' The well-known effect of running cars is to raise a dust, and the requirement, although affirmative in form, in substance restricts the respondent to running cars in such a way as not to raise a dust." *Newcomb v. Norfolk Western St. Ry. Co.* (1901), 179 Mass., 449.

Like all ordinances, the ordinance must be reasonable. In a case in the Pennsylvania Superior Court, *Chester City v. Traction Co.* (1897), 4 Pa. Sup. Ct., 575, where a statement of facts was agreed upon by the parties and submitted to the court, the statement set forth that the traction company's cars "while passing along the above-mentioned streets and avenues raise dust, which is collected upon the said streets, into the air, producing inconvenience and discomfort to persons passing along the said highways and to persons occupying residences bounding thereon." The city authorities enacted an ordinance, requiring every street railway company using any street, to cause the same to be sprinkled, for the distance of three feet six inches, each way, from the centre of the railway track, "so that no dust will be raised by a passing car on said tracks." The ordinance provided a penalty of \$25.00 for each breach of its provisions and \$25.00 per day for a continued violation. It was further ordained, that if the offending company should fail to pay the penalties imposed, the proper officers of the city should have power to stop the running of all cars operated by such company. It was held that that portion of the ordinance which authorized the stopping of the cars for the failure to pay penalties was so clearly unreasonable and offensive as to be void, beyond all controversy. To enforce it would amount to a forfeiture of the rights and franchises of the company and the practical destruction of its property. The ordinance was also considered unreasonably burdensome because it was as operative in midwinter as in midsummer. The court pointed out that there often occur in

our climate, in December, January and February, successive periods during which, although the temperature may be far below the freezing point, the dust on largely traveled city streets is almost as annoying as it usually is in July and August. The sprinkling of the seven-foot strip would have to be frequently repeated, day and night, in order that "no dust" would be raised, because of the freezing of the water.

An ordinance which made it unlawful to run electric, trolley, or other cars or trains on the street "without first providing in some reasonable manner for the sprinkling of the streets through which their cars run" and making violation a misdemeanor punishable with imprisonment and fine was, in 1897 (*State v. New Orleans C. & L. R. Co.*, 49 La. Ann., 1571), held void from indefiniteness and burdensomeness. In regard to the first particular the court pointed out that the ordinance did not set forth with the least particularity what should be done, or the extent of the service required in order to escape the penalty it ordained should be inflicted for not sprinkling the streets. The failure or performance might vary each day and in each locality where sprinkling might be required. No attempt was made to indicate how the work should be performed; the days the streets should be sprinkled; the capacity for sprinkling the sprinklers should have, and the number of sprinklings that should be applied each day, or at such time as might have been intended. It was also held that in so far as related to the work of "sprinkling" the streets from curb to curb, less that portion over which the company had a franchise, the requirement of the ordinance was not equal and uniform. But in the following year, 1898, the same court held that an ordinance providing "that each and every company or corporation operating street-car lines within the limits of the city of New Orleans shall water their tracks so as to effectually keep the dust on same laid" and providing a penalty for its violation was neither indefinite nor wanting in uniformity.—*State v. Claiborne R. Co.*, 50 La. Ann., 1189. The questions which the court set out to consider were (1) whether the ordinance was unreasonable; and (2) whether it was an attempt to place a public burden on private persons. It distinguished the ordinance from that which had been declared void the year before in three respects: (1) the later ordinance did not provide, as the prior ordinance did, that it should be unlawful for companies to operate cars without providing for "the sprinkling of the streets through which their cars run." (2) It did not, like the first, make a violation a misdemeanor. (3) It simply required that every corporation "shall water their tracks so as to keep the dust on same laid." The duty imposed by the later ordinance was specific; "that is, 'to water their tracks.' It does not require them to 'sprinkle the streets,' nor to sprinkle their tracks; but to 'water' them. Water them where, and to what extent? 'So as to effectually keep the dust laid on same.' To water that part of the street which is occupied and used by their tracks, and immediately covered by their franchises, is an altogether different thing from sprinkling the streets from curb to curb, and to a very great extent, at least, relieves the ordinance of the onerous and oppressive feature that was properly attributed to the former ordinance—the imposition upon private individuals and corporations of a public burden." It was also held that the ordinance was a legal exercise of the police power of the city. It tended to promote the comfort and convenience of passengers, and the health and comfort of the inhabitants of the city. In this regard the court approved the decision in *City & Suburban R. Co. v. Savannah* (1886), 77 Ga., 732, where a street railway company, which had been fined for neglecting to water its track as required by an ordinance,

challenged the ordinance as being without legal authority and void. It was held that the ordinance was authorized by the broad provisions of the city charter to make all requisite and necessary ordinances of the city "for the security, welfare, and convenience of the said city and its inhabitants, and for preserving health, peace and good government within the limits of the same." "Surely," the court said, "to keep down the dust from the railway's own tracks, by watering them, within the city limits, and on its streets, is a very requisite and necessary thing for the welfare and convenience of the inhabitants on the streets over which the road is constructed, to say nothing of its health-preserving effect. The cars constantly run; almost every minute they pass each house on the street, and if the track be left unwatered, the dust becomes very inconvenient to those who lodge in the house, and in warm weather sit on the stoop, or open the windows." Nor was the Georgia ordinance vitiated by partiality. "It affects alike all railways traversing the streets, and thus embraces impartially every person that runs continuously and constantly on the streets, and raises this inconvenient dust constantly when the track on which such person runs is left unwatered. Because only an artificial person does this by virtue of chartered permission to construct and use the track, and run on it constantly, is no reason to show the ordinance not general. It embraces all who exercise the same right and work the same inconvenience to occupants of houses on the street."

Several novel points were raised in a recent Wisconsin case, *State v. Milwaukee Electric R. & L. Co.* (1911), 144 Wis., 386. The city of Milwaukee in 1902 passed an ordinance requiring all street railway companies operating lines in the city to sprinkle with water the entire roadbed of the railways operated, between single tracks and double tracks and one foot outside of all tracks, as well as the space between double tracks, under rules and regulations adopted from time to time by the board of public works and approved by the council. No sprinkling was to be done between November 1 and April 1. The expense of the sprinkling was to be borne by the street railway companies, except that the city was to furnish the necessary water free of charge. Violation of the ordinance was made punishable by fine. No rules and regulations were adopted by the board until July, 1905. The rules then adopted provided that the sprinkling should be done on all days from April 1 to November 1, except Sundays and legal holidays and such days as sprinkling was unnecessary by reason of rain; that the sprinkling should be done in such a manner as to keep the surface moist and prevent dust from arising between 6 a. m. and 7 p. m., but not in such a manner as to create mud or pools of water, and that paved streets should be sprinkled lightly to meet the requirements, but graveled or macadamized streets should be thoroughly wetted down. For five years a street railway company refused to obey the ordinance. The city then brought mandamus to compel it to do so. It was held that the sprinkling of the streets is a public duty and benefit, and an ordinance providing therefor is one to preserve the public health and promote its comfort; that mandamus was the proper remedy to compel the railway company to sprinkle the streets. It cannot be said that a city has not sufficient financial interest in the controversy to maintain mandamus because it might compel abutting owners to do the sprinkling, as it is not obliged to do so, and in any event would retain the obligation to sprinkle the crossings. The ordinance was not unreasonable, when properly construed, because it provided that the surface of the street was to be kept moist, "but not in such a manner as to create mud or pools of water." The provision meant that the company must exercise

ordinary care and caution in doing the work. Finally, the ordinance was held not discriminatory, because, in the matter of stirring up dust, street-car lines fall into a class by themselves. "Their cars are large and heavy and run at a high rate of speed and with great frequency. The bodies of such cars rest close to the surface of the street. They occupy a very considerable part of the best portion of the streets to the exclusion of the general public a large part of the time. They run on tracks which create peculiar conditions for the accumulation of dust and dirt, and they occupy the streets by permission from the common council and not as a matter of absolute right."

An ordinance of the city of St. Paul, Minn., requiring street railway companies to water their tracks so as to effectually keep the dust laid while cars are in operation, "provided, however, such watering shall not be done when the temperature is at or below the freezing point," was held to be reasonable, and to be applicable to the uninhabited portion of the city, as well as the business centres and the residence districts, and to cover winter as well as summer, with the single exception that sprinkling should not be required when the temperature is at or below freezing point. The health and comfort of those riding in the cars were held to be quite as important as of those residing or traveling in the vicinity; and the burden of the extra expense for water and the distance to be covered was held not to be unreasonable.—*City of St. Paul v. St. Paul City Ry. Co.* (1911), 114 Minn., 250.

The following cases may also be cited as relating to the care of street railway companies' roadbeds: It has been held that an ordinance requiring street car companies to keep the surface of the streets between their outer rails clean does not illegally discriminate against, or cast the public burden upon, them, where their tracks tend to accumulate dirt, and make the crown of the street flat, so as to render the cleaning of the street much more difficult than it otherwise would be. A municipality, in granting authority to a company to operate its cars in its streets, cannot deprive itself of the power to compel the company to clean the street between its outer rails, if the exercise of such power is necessary to the health and comfort of the people.—*City of Chicago v. Chicago Union Traction Co.* (1902), 199 Ill., 259; 59 L. R. A., 666.

An ordinance prohibiting the use of salt on a street railway track except on curves at street corners is not invalid as an impairment of the franchise of a street railway company, or a restriction of the operation of its road, merely because it will occasion inconvenience, or involve expense, or prevent the company from operating the road so successfully.—*Consolidated Traction Co. v. City of Elizabeth* (1896), 58 N. J. L., 610; 32 L. R. A., 170.

A contract between a city and a street railway company provided that the company, under instructions from the city, should keep its tracks free from ice and snow, and the city might, at its option, remove the whole or such part of ice and snow, from curb to curb, as it might see fit, from any street or part of a street in which cars were running, the company to pay one-half of the cost thereof. It was held that, under these provisions, the company was bound to keep its tracks clear from ice and snow, but not to remove or cause to be removed from the streets, and convey elsewhere, the snow which it so cleared from its tracks. The company, without the permission of the city council, might use, for the purpose of clearing the snow or ice from its tracks, electric sweepers, rotary brushes, or other similar apparatus which sweeps the snow or ice into the streets.—*Montreal v. Montreal Street Ry. Co.* (1900), 19 Quebec Super. Ct., 504.

CHICAGO REFUSE DISPOSAL

Reports of Experts—Comparison of Six Projects— Refuse Collection—Incineration Plants—Reduction Methods—Paper Burners.

As has been reported in our news columns from time to time, Chicago last winter found itself, at the termination of a garbage disposal contract, without any definite and certain method for future disposal. The City Waste Commission in January engaged Irwin S. Osborn, who designed, constructed and managed the garbage reduction plant of Columbus, and John T. Fetherston, who has had charge of designing, operating and constructing the destructors at Staten Island, New York City, to prepare a comprehensive report and recommendation. It would have been difficult to find two men better fitted for this, since each has had practical experience in all phases of refuse collection and disposal, operating for a municipality, one being an expert in incineration, the other in reduction. An abstract of those parts of their report which are of general interest and value is given below, preceded by the recommendations in full. The report and recommendations were the result of personal observations and studies of data submitted by the committee, assisted by a technical staff, continuing from January 16 to March 31. They were assisted by Samuel A. Greeley, Richard T. Fox and W. R. Hillyer, and drew upon information collected by the bureau of streets, bureau of efficiency of the civil service commission and other city departments.

Their recommendations are as follows:

1. That the city should own and operate a complete refuse collection and transportation equipment; also refuse disposal works.
2. That regular and systematic collection of separated classes of wastes (ashes, garbage, and rubbish) be made at daily or tri-weekly intervals, depending on the character of the districts served and the seasons of the year.
3. That the laws regarding house treatment in respect to the separation of the different classes of waste be strictly enforced.
4. That separation of all classes of refuse be made by

12. That the mechanical analyses and tests of refuse started early this year be continued for a period of at least one year or longer to determine the seasonal variation of the several classes of waste.

13. That a competent technical staff be employed to develop, install and operate for at least one year the project herein recommended, and to make such further studies and tests necessary to determine in detail the most suitable types of receptacles and equipment for a model collection service.

14. That the maintenance division in charge of the collection and disposal systems installed be provided by the technical staff with carefully determined standards of performances and unit costs, in order that proper control may be exercised over the work.

15. That three million five hundred and thirteen thousand dollars (\$3,513,000) be provided for the purchase of collection and transportation equipment, and the construction of reduction works and incinerator plants. Of this sum, eighty-five thousand dollars (\$85,000) should be made available for the first year's expenses of the technical staff.

Six projects for refuse disposal were considered, these being (A) the incineration of garbage and rubbish collected together and a portion of the ashes; (B) the collection and incineration of all three together; (C) the division of the city into nine collection districts, with a loading station in each district, the incineration of garbage at a single plant, and of the rubbish from seven districts at incinerators adjoining sewage or water pumping stations in those districts; (D) the reduction of the garbage at a central reduction plant and the burning of the rubbish at local incinerators, fourteen collection districts being provided, with a loading station in each district (this was the project finally decided upon); (E) the location of the reduction works on the drainage canal, requiring the garbage to be transferred a longer distance than in D, but this project being otherwise the same; and (F), also similar to D, except that the rubbish would be transferred from loading stations to four incinerators, where it would be burned and the power utilized. The capital cost, annual cost and net annual cost of each one of these projects is given herewith, together with the costs in detail for the project adopted. In the calculation, the grease recovered from the garbage was estimated to be 3.25 per cent of the

Capital Cost, Annual Cost and Net Annual Cost of Several Projects.

	Project "A"	Project "B"	Project "C"	Project "E"	Project "F"
Total Capital Cost.....	\$4,554,000	\$7,993,750	\$4,099,125	\$3,525,000	\$3,651,625
Total Annual Cost.....	2,617,152	3,203,711	2,783,956	2,690,411	2,786,059
NET ANNUAL COST.....	2,476,827	2,563,000	2,617,436	1,964,757	2,003,584

the householders, except in districts where the combined refuse is disposed of by incineration.

5. That separated garbage be treated by the reduction process at a central plant, located for service by barges to be used in transporting the material from waterfront loading stations, except such garbage as may be economically hauled by wagon or truck direct to the plant.

6. That separated ashes be disposed of by filling low lands or depressions in need of grading, and as far as practicable that such lands be purchased by the city, so as to secure the benefit from the enhanced value derived from the improvements.

7. That small incinerators be constructed at each loading station for burning the separated combustible rubbish. Other classes of rubbish, including metals, glassware, etc., should be reclaimed at the loading stations and sold. The unsaleable and incombustible rubbish should be disposed of with the ashes.

8. That the present garbage loading stations be remodeled and that at least three additional garbage loading stations be provided on the river or canal.

9. That a loading station for ashes be provided in each district where street car transportation is more economical than direct team haul to dumps.

10. That garbage receiving stations for motor trucks be provided to reduce the team haul.

11. That a modern high temperature refuse incinerator be installed at Stony Island avenue and 95th street to dispose of the combined refuse from that district.

Estimated Capital Cost, Annual Expenditure, Revenue and Net Annual Cost, Project "D."

CAPITAL COST.	
Collection Equipment.....	\$683,500.00
Stables.....	600,000.00
Loading Stations.....	600,000.00
Street Cars.....	140,000.00
Water Transportation Equipment.....	100,000.00
Motor Trucks.....	72,000.00
Incinerators.....	395,000.00
Reduction Works.....	868,500.00
Total Capital Cost.....	\$3,513,000.00
ANNUAL COST.	
(Operation, maintenance and fixed charges.)	
Collection.....	\$1,766,286.00
Loading Stations.....	92,713.00
Street Car Transportation.....	226,724.00
Water Transportation.....	56,695.00
Motor Truck Transportation.....	58,259.00
Incinerators.....	88,892.00
Reduction Works.....	372,192.00
Total Annual Cost.....	\$2,661,761.00
REVENUE.	
Reduction Works (grease & tankage).....	725,654.00
NET ANNUAL COST.....	\$1,936,107.00

total weight of the garbage delivered; the tankage to be 14 per cent of its total weight. The average price for tankage varies from \$6 to \$10, and was taken at \$7 in the calculation. The value of garbage grease was assumed at 4 cents per pound, the average price received during the past seven years having been approximately 4.13 cents per pound.

In addition to these six projects there was also considered total incineration at one central plant and combined reduction and incineration at a central plant, but it was soon seen that the cost of these would be much higher than the others, without compensating advantages.

No matter what system of disposal is adopted, it was believed that there would for a number of years be such a demand for inorganic wastes for filling in low lands that no other disposition of these was considered. The treatment of garbage by the reduction process was believed to be the logical method to be pursued, on the grounds of sanitation and economy.

The project recommended provides for increasing by approximately 50 per cent the service rendered to the citizens as represented by frequency, regularity and amount of collections. For the year 1912 the cost of collection, transportation and disposal of refuse in Chicago was approximately \$1.87 per ton. It is estimated that under the project recommended the cost per ton will be \$1.48 in 1920, a saving of over \$500,000 for that year. It is believed that this project treats each class of material to the best advantage, with the least outlay for plant investment, and provides the most feasible, practical, sanitary and economical method for the solution of the problem.

GENERAL DISCUSSION ON REFUSE COLLECTION.

Considerable might be said relative to an effective organization, but the main elements can be summed up as follows:

1. Individual responsibility for work assigned is necessary.
2. Employees should be paid for the work performed, instead of for the hours of labor.
3. Published records of employees individually, by sections under foremen and by districts under inspectors or superintendents, will create a healthy rivalry and conduce to better work.
4. Unit costs of all work should be maintained, and the cost keeping will more than pay for the clerical work involved.
5. Vacations for all yearly employees, from laborers upward, with extra time off for men of high standing, will prove beneficial.

Efficient service in the collection of municipal waste can be obtained by two methods, as follows:

1. By contract where the work is specified and the requirements are such as to obligate the contractor to furnish the desired service.

The contractor must maintain an effective organization, sufficiently equipped and managed to be able to render proper service. Under this method, a rigid inspection is necessary on the part of the city, and the full compliance on the part of the contractor in carrying out his agreement.

2. By municipal collection, where the city conducts the work with its own teams, and equipment, and the men employed on the work are directly responsible to their superiors, who, in turn, are responsible to the public for the service rendered.

The advantages of this method are:

- (a) The service is rendered as desired. It is not necessary to specify how and what work is to be done, but the work can be conducted so as to meet conditions as they may arise.
- (b) The work comes directly under the control of the officials whose chief object is to render satisfactory service at a reasonable cost.
- (c) Better equipment can be provided, and the work planned on a more systematic basis, when investments are permanent. By making permanent investments the first cost can be increased, which results in the use of more modern equipment.

(d) Municipal operation eliminates the tendency on the part of the contractor (when work is done by contract) to obtain the largest remuneration possible, at the least cost.

It is impossible to develop an efficient organization, or render the best service in collection with hired teams, where the driver receives his pay from the employer, who in turn receives pay from the city for furnishing the team and driver.

The adopted methods of refuse collection in different cities abroad vary, and in the majority of cities where modern equipment has been installed the vehicles are so constructed as to permit and require the loading of refuse from receptacles without exposure of their contents. The particular type of equipment in each city may differ, but nearly all vehicles are designed to be operated in conjunction with a standard receptacle.

To maintain successfully and efficiently the work of collecting municipal waste, regulations as to house treatment of refuse should not only be enforced, but considerable time should be spent by municipal officials in educating and training the people in co-operating for mutual advantage.

Combined collections will require a more frequent collection of ashes and rubbish than if garbage be collected separately. If a separate collection of garbage is made, a more frequent collection of garbage can be made, and a less frequent collection of ashes and rubbish. The ability of men and teams to collect refuse does not depend on the amount collected, but upon the number of stops, distance of travel and the number of receptacles to be handled. A daily collection necessarily costs more than a collection every other day, and a collection twice a week more than once a week. From a sanitary standpoint, due to the nature of the material, garbage will require more frequent collections than other classes of waste.

If all wastes are collected combined, as a rule the unit cost for collection will be less than if collected separately.

INCINERATION.

In 1896 the incineration of refuse was introduced in Germany, when an English type of destructor, known as the "Horsfall," was installed at Hamburg. This plant is still in operation. From the experience gained with British destructors, the German engineers have developed a destructor, constructed with single cells, having large combustion chambers, the gases from the combustion chambers being passed through boilers for generating steam. The German furnaces are known as the "Herbertz" or "Humbolt" type, and differ from the English furnace in the type of grate, which is made smaller than that found in the latter kind. The furnace is charged with refuse to a greater depth than in English practice, and the air pressure for the forced draft is increased.

Experience in connection with the development of power from refuse furnaces demonstrates that it is not easy to find an available use whereby the power developed can be utilized regularly as produced and the furnace operated continuously. In the majority of plants constructed, both in Europe and America where power is developed, it has not been possible to utilize all the power available, and in most cases the use is limited to the operation of the plant.

When the power developed is used in lighting and power stations, the demand only occurs during part of the day. Supplementary coal-fired boilers are usually found in connection with destructor-electric-lighting stations, or else the destructor is much larger than would be required to deal with the refuse alone. The power produced from refuse furnaces will best be utilized by some local industry, such as ice-making plants

or electro-chemical plants, which require continuous operation.

When the power is used in connection with pumping plants it is found good practice to operate the refuse plant only as an auxiliary to the power plant of the pumping station. The saving that results, or credit that can be given the destructor plant will amount to the value of the fuel equivalent to that which would be required to produce the amount of steam developed and used. The fluctuating amount of power developed in most cases can be depended upon only for the average minimum production.

In selecting a site for the location of a refuse disposal plant from which power is developed, it is not always possible to profitably utilize the power where the demand is not constant, and where the demand would be constant, suitable sites are not always available. One of the best examples of a destructor plant disposing of refuse and utilizing the power is found at Westmount, a suburb of Montreal. The refuse destructor is constructed in connection with a municipal electric power station, and the power developed is utilized in generating electricity for lighting purposes. The plant is operated only during the time when the lighting load is in demand, and the material as delivered is stored during the day, and burned at night. Only a part of the power is furnished by the refuse furnaces, the remainder being obtained from a coal-fired boiler plant.

GARBAGE REDUCTION.

The two methods might be described as follows:

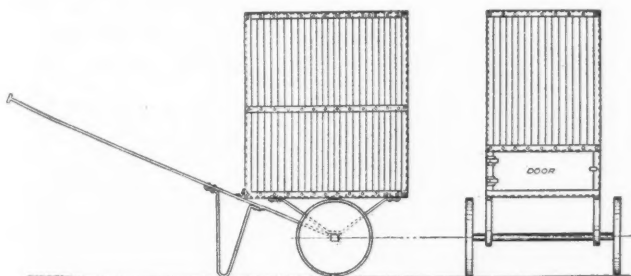
Drying Method.—The drying method consists in crushing or grinding the crude garbage and passing it through direct heat dryers to drive off the moisture and break down the cells. The dry solids are then placed in extractor tanks, and the grease recovered by percolation, using gasoline as a solvent.

Cooking Method.—The cooking method consists of placing the garbage in digester tanks, where it is cooked, and then extracting the free grease and moisture by pressing. The solids from the presses are then dried, and in the more modern plants the dried tankage is percolated to recover the grease that is not extracted by the presses.

The relative advantages of the two methods give rise to a difference of opinion, although at the present time the majority of plants are operated by the cooking method.

PAPER BURNERS.

Portable burners for the disposal of waste paper and light combustible rubbish have been used in Chicago since 1911. Their use has been extended so that at the present time there are approximately 143 burners operating in 30 wards. The burners consist of an iron basket carried on wheels. The capacity of the burners varies from 11 to 17 cubic feet.



SKETCH OF CHICAGO PAPER BURNER.

The operation of a burner requires the labor of one man who pulls the burner through the alley or down the street, picking up loose papers scattered on the

street, or in piles on the streets or alleys, also emptying loose paper receptacles into the burner.

In order to determine the work done by the operation of paper burners, studies were made in several wards, and in all twelve tests were made, which demonstrated that from eight to nine cubic yards of paper were destroyed per day in each burner. At this rate of burning the cost of disposal would be somewhat cheaper than the cost for removal by wagon.

From investigations made the following comments are made relative to this method of paper disposal:

1. There are certain wards where the citizens object to the use of the burners on account of the smoke nuisance.

2. The burners are operated approximately 200 days per year, and do not constitute a regular method of disposal, as there are rainy days and snowy days when they do not operate.

3. The studies were made in January, 1914, during cold weather, when considerable amount of paper is burned in the houses. The capacity of the paper burners was not crowded, and the assistant superintendent of streets, Mr. Galligan, was of the opinion that the burners will handle a greater amount of paper in the summer months.

4. From the economical standpoint, the burners have proved advantageous, but are not as desirable as removal of the material, unless skilfully operated to minimize smoke and odors.

UNIT COSTS OF STREET CLEANING

Plan Worked Out by New York's Commissioner of Accounts—Actual Figures Obtained by Five Months' Use in Department.

Early in 1913 the commissioner of accounts of New York city, Harry M. Rice, experimented on the keeping of cost accounts of the activities of the Department of Street Cleaning, and formulated a scheme for securing the desired results. A study was made of the conditions of the streets, the section stations, and the district superintendents' offices, with especial attention to the grade of intelligence of the employees in the field, with the purpose in view of devising a plan that would present itself in a simple and easily understood form to these men; the more difficult work of tabulating the information contained on these forms being assigned to the main office of the department.

Later in the year the experiment was extended throughout the entire district, and demonstrated the practicability of obtaining unit costs for street cleaning which will furnish knowledge as to the efficiency of the work done by the departmental forces.

The methods employed and the results obtained are given in the following report, with its accompanying tables.

Exhibit "A" shows separately the cost statistics affecting the functions of hand sweeping, hose flushing, machine sweeping, street sanding and sprinkling to lay dust in each section, with a summary of the gross cost of each, showing the total cost of cleaning the streets in District No. 9 during the five months under review.

Exhibit "B" shows various cost and statistical units as applied to the total cost of street sweeping in this district for the same period, the more important items being:

Average daily cost of street sweeping per 1,000 square yards;

Average monthly cost of street sweeping per canful, cubic yard and load;

Quantities collected per 1,000 square yards swept;

Number of square yards swept to collect one load.

A detailed description of the method is presented in the following:

The use of horsepower sweeping machines will require

an analysis of the stable expenses to ascertain the cost of operation. The maintenance of idle and sick horses and machines not in use will be distributed as a burden cost over the daily average number in use. The salaries of the district superintendent and of the section and assistant foremen who supervise the work will be distributed pro rata in proportion to "Hand Sweeping," "Hose Flushing," "Machine Sweeping," "Street Sanding" and "Sprinkling to Lay Dust."

Sources of Information.—The daily reports of the district superintendent, the section foremen and the men detailed in charge of machine sweeping and sprinkling will determine the quantity and the location of work performance.

The records of the payroll clerk will supply the amount paid for salaries and wages.

The property clerk will furnish the cost and length of life of the equipment. The master mechanic will report the number of articles repaired in the district, and the bookkeeper's office will supply the cost of each class of repairs, from which, in connection with the master mechanic's report, an average repair cost will be obtained.

This proposed method of applying the average cost of repairs is necessary because, owing to the accounting method employed, it is impossible at the moment to charge the cost of each repair item direct.

The Section Foreman's Daily Report.—The number of square yards swept by hand and the number of canfuls of sweepings collected each day will be entered on each section foreman's daily report, a small hand stamp as follows being provided for this purpose:

"Section No.
 "Number of canfuls collected.
 "Number of square yards.
 "Number of square yards obstructed.
 "Number of square yards to be cleaned.

The section foreman will be provided with a memorandum book in which he will enter the date, location and dimensions of each obstruction, also the date of its removal. From this book he will enter the number of square yards obstructed on his daily report. By subtracting this number from the total square yards in his district the remainder will show the number of square yards to be cleaned. He will then state in his report entire section swept, or if this is not the case then the actual amount of work performed.

The section foreman will describe, on his daily report, the locations where hose flushing was done, together with the names and civil service titles of the men, and the number of hours employed.

Control of Work Performance.—Each section will be divided into a number of "sweeper's routes," designated by serial numbers and varying in square yard area according to conditions.

Each section foreman will be provided with a map of his section on which will be entered the square yard area of each block and each intersection. Each "sweeper's route" will be indicated in a different color on the map and bear its serial number. The map will be suspended on the wall of the section station, and all employees, by consulting it, may become familiar with their respective route numbers.

The section foreman will be provided with a bound book in which the "sweeper's routes" in serial number will be printed, one route on a line, on the left side of the page. To the right of these will be thirty-one ruled columns captioned with the number of the days of the month, and a final total column. Each page will therefore show a complete record for one month. In this book the section foreman will be required to have entered each day the number of canfuls of sweepings collected by each of the sweepers assigned to the several routes,

The sweepers will make their reports to the section foreman at evening roll call on printed forms bearing the date, route number, number of canfuls collected and name of sweeper.

At the end of the month the section foreman will report to headquarters on a form which will duplicate a page of the book above described.

The District Superintendent's Daily Reports.—Each class of machine work will be reported every day by the district superintendent on a regular form on which each street and the intersecting streets, from and to, will be separately entered. This report will show the names of the men and hours employed and the number of vehicles used. The square yard areas will be entered at headquarters from a schedule covering each block and intersection in the district.

Tabulation of Daily Reports.—The data as entered on the daily reports will be tabulated at headquarters in a series of tables, prepared to receive the items pertaining to each section separately in parallel columns, and a final column to show the total for the district in the cross-footing. The tables will be designated and show for each day as follows:

Table No. 1—Number of square yards swept by hand.

Table No. 2—Number of canfuls collected.

Table No. 3—Number of square yards swept by machine.

Table No. 4—Time and pay of men employed on machine sweeping.

Table No. 5—Number of square yards flushed by hose.

Table No. 6—Time and pay of men employed on hose flushing.

Table No. 7—Number of square yards sprinkled to lay dust.

Table No. 8—Time and pay of men employed on street sprinkling to lay dust.

Table No. 9—Number of square yards sanded.

Table No. 10—Time and pay of men employed on sanding.

Additional forms of daily reports and their tabulation will be added as other activities are found. This method is elastic and will record what is done without interference with needed changes and improvements in the operations of the working force and will provide the means of obtaining and tabulating in monthly totals the record of work performed.

Cost Distribution.—Hose flushing is done by men who are paid for sweeping. The foremen and assistant foremen, in addition to directing the sweepers, also have supervision of the drivers who make house collections of garbage, rubbish and ashes. The canfuls of street sweepings collected by the street sweepers are carted together with the ashes to the dumping stations for subsequent final disposition. The district superintendent has general supervision over the sweeping and carting and direct supervision over machine work and street sprinkling to lay dust.

Appropriate monthly schedule forms have been prepared for the recording of necessary cost data. The monthly totals as shown on Exhibits "A" and "B," attached hereto, are drawn from these schedules, a description of which follows:

District Schedule No. 1.—This schedule will display a distribution of the force of sweepers and cart drivers by sections, and also show drivers of sweeping machines, sanders and sprinkling carts. This will afford a basis for calculating the percentage of the number of men supervised, and show the number employed independently of the section foremen, as distinguished from

DEPARTMENT OF STREET CLEANING.

Unit Cost, Exhibit "A."

Unit Cost of Street Sweeping, Including Payroll, Equipment and Repairs, Showing Separately the Unit Cost of Hand Sweeping, Hose Flushing, Machine Sweeping, Street Sanding and Street Sprinkling to Lay Dust.

District 9, Manhattan, Which Comprises Sections 29, 31, 33 and 35.

For the Months of April, May, June, July and August, 1913.

	April.	May.	June.	July.	August.	Total for Five Months.
Unit Cost of Hand Sweeping.						
Cost of hand sweeping—Sec. Sched. 3.	\$5,981.47	\$6,229.21	\$5,999.74	\$6,370.93	\$6,215.79	\$30,797.14
Number of sq. yds. swept—Table 1...	19,041,200.78	18,886,268.54	18,805,201.23	19,400,704.84	19,470,846.27	95,604,221.66
Cost of hand sweep. per 1,000 sq. yds.	\$0.3141	\$0.3298	\$0.3190	\$0.3283	\$0.3192	\$0.3221
Number of canfuls of sweepings collected—Table 2	21,302	22,355	20,788	21,480	21,121	107,046
Cost per canful	\$0.2807	\$0.2786	\$0.2886	\$0.2965	\$0.2943	\$0.2877
Cost per cu. yd. of 9 canfuls	\$2.5271	\$2.5074	\$2.5974	\$2.6694	\$2.6487	\$2.5893
Cost per load of 1.55 cu. yds.	\$3.9170	\$3.8865	\$4.0260	\$4.1362	\$4.1055	\$4.0134
No. of days on which work was done.	30	31	30	31	31	153
Daily average cost	\$199.38	\$200.9423	\$199.9913	\$205.5138	\$200.5094	\$201.2885
Unit Cost of Hose Flushing.						
Proportion of district expenses—District Schedule 1	\$1.31	\$4.16			\$0.87	\$6.34
Proportion of rent of section station—Section Schedule 3	\$0.58	\$3.33			\$0.64	\$4.55
Payroll cost of hose flushing—Section Schedule 1	\$41.91	\$138.54			\$28.59	\$209.04
Estimated cost of equip., including depreciation—Sec. Sched. 2, Part B.	\$62.61	\$62.61	\$62.61	\$62.61	\$62.61	\$313.05
Cost of hose flushing	\$106.41	\$208.64	\$62.61	\$62.61	\$92.71	\$532.98
No. of sq. yds. flushed by hose—Table 5	216,090.07	643,734.28			70,348.38	930,172.73
Cost of hose flushing per 1,000 sq. yds.	\$0.4924	\$0.3241			\$1.3179	\$0.5730
Unit Cost of Machine Sweeping.						
Proportion of district expense—District Schedule 1	\$13.03	\$8.28	\$7.37	\$11.65	\$6.07	\$46.40
Payroll cost of machine sweeping—District Schedule 1	\$217.36	\$190.79	\$203.30	\$227.28	\$217.30	\$1,056.03
Estimated cost of equipment and repairs—District Schedule 2	\$421.48	\$446.98	\$452.24	\$494.47	\$530.53	\$2,345.70
Cost of machine sweeping	\$651.87	\$646.05	\$662.91	\$733.40	\$753.90	\$3,448.13
Number of square yards swept by machine—Table 3	2,971,524.01	2,414,664.95	2,374,849.04	2,778,233.21	2,513,968.81	13,053,240.02
Cost of mach. sweep. per 1,000 sq. yds.	\$0.2194	\$0.2676	\$0.2791	\$0.2639	\$0.2999	\$0.2642
Proportion of district expenses—District Schedule 1			\$7.37	\$5.83	\$6.07	\$19.27
Payroll cost of street sanding—District Schedule 1			\$82.23	\$199.29	\$36.84	\$318.36
Estimated cost of equipment and repairs—District Schedule 3			\$189.22	\$452.72	\$86.33	\$728.27
Cost of street sanding			\$278.82	\$657.84	\$129.24	\$1,065.90
Number of sq. yds. sanded by mach.			496,019.29	1,182,815.23	228,931.98	1,907,766.50
Cost of st. sanding per 1,000 sq. yds.			\$0.5641	\$0.5562	\$0.5645	\$0.5587
Cost of St. Sprinkling to Lay Dust.						
Proportion of district expenses—District Schedule 1			\$1.86	\$1.94	\$4.05	\$7.85
Payroll cost of street sprinkling—District Schedule 1			\$52.00	\$59.00	\$59.50	\$170.50
Estimated cost of equipment and repairs—District Schedule 3			\$156.65	\$150.92	\$163.75	\$471.32
Cost of street sprinkling			\$210.51	\$211.86	\$227.30	\$649.67
Number of square yards sprinkled by machine—Table 7			Not reported	Not reported	2,350,881.63	
Cost of st. sprinkling per 1,000 sq. yds.					\$0.0967	
Summary—Cost of Street Sweeping.						
Cost of hand sweeping	\$5,981.47	\$6,229.21	\$5,999.74	\$6,370.93	\$6,215.79	\$30,797.14
Cost of hose flushing	106.41	208.64	62.61	62.61	92.71	532.98
Cost of machine sweeping	651.87	646.05	662.91	733.40	753.90	3,448.13
Cost of street sanding			278.82	657.84	129.24	1,065.90
Cost of street sprinkling to lay dust.			210.51	211.86	227.30	649.67
Total cost of street sweeping to Exhibit "B"	\$6,739.75	\$7,083.90	\$7,214.59	\$8,036.64	\$7,418.94	\$36,493.82

Unit Cost, Exhibit "B."

Unit Cost of Street Sweeping, Including Payroll, Equipment and Repairs, Also Including Cost of Hose Flushing, Machine Sweeping, Street Sprinkling and Street Sanding.

	April.	May.	June.	July.	August.	Total for Five Months.
Cost of street sweeping—"Unit Cost, Exhibit 'A'"	\$6,739.75	\$7,083.90	\$7,214.59	\$8,036.64	\$7,418.94	\$36,493.82
Number of sq. yds. swept—Table 1...	19,041,200.78	18,886,268.54	18,805,201.23	19,400,704.84	19,470,846.27	95,604,221.66
Cost of sweeping per 1,000 sq. yds.	\$0.3539	\$0.3751	\$0.3836	\$0.4142	\$0.3810	\$0.3817
Number of canfuls of sweepings collected—Table 2	21,302	22,355	20,788	21,480	21,121	107,046
Cost per canful	\$0.3164	\$0.3169	\$0.3470	\$0.3741	\$0.3513	\$0.3400
Cost per cu. yd. of 9 canfuls	\$2.8476	\$2.8521	\$3.1230	\$3.3669	\$3.1617	\$3.0681
Cost per load of 1.55 cu. yds.	\$4.4138	\$4.4208	\$4.8406	\$5.2186	\$4.9006	\$4.7556
No. of days on which work was done.	30	31	30	31	31	153
Daily average cost	\$224.66	\$228.5129	\$240.4863	\$259.2464	\$239.3206	\$238.5217
Daily aver. number of sq. yds. swept.	634,706.69	609,234.4690	626,840.0410	625,829.19	628,097.8152	624,864.1939
Daily aver number of canfuls collected	710.0667	721.1290	692.9333	692.9032	681.3226	699.6471
Daily average number of sweepers employed	67.76	67.6462	62.0667	62.5484	63.6129	64.7268
Daily average number of sq. yds. swept per sweeper	9,366.9818	9,006.1891	10,099.4582	10,005.5187	9,873.6548	9,653.8713
Daily average number of canfuls collected per sweeper	10.4791	10.6603	11.1643	11.0779	10.7104	10.8092
Number of canfuls collected per 1,000 square yards swept	1.1187	1.1837	1.1054	1.1072	1.0847	1.1157
Number of cubic yards collected per 1,000 square yards swept	.1243	.1315	.1228	.1230	.1205	.1244
Number of loads collected per 1,000 square yards swept	.08	.0848	.0792	.0794	.0777	.0803
Number of square yards swept to collect one load	12,500	11,792.4528	12,626.2626	12,594.4584	12,870.0129	12,453.3001

those employed under the section foremen for hand sweeping and carting.

This schedule will contain (a) the district superintendent's salary for the month; and (b) the estimated cost of his horse and buggy taken from district schedule No. 2. The total of these items will be distributed in district schedule No. 1 over the sections, (a) to machine sweeping, sanding and sprinkling on the basis of percentage of square yard area covered by each, and (b) to hand sweeping and carting on the basis of percentage of square yard area in each section.

The adoption of this method of distribution for machine work is necessary because the monthly schedules show cost percentages to be different in various sections, while as to hand sweeping and carting the entire area is covered in each section every day.

The operating cost of each class of machine work will be distributed separately among the sections on the same basis as the proportion of district expenses.

Having ascertained the proper distribution, by sections, of the proportion of district expenses chargeable to machine work, there will be shown in another part of the schedule the distribution of the percentage of district expenses by sections to carting, hose flushing and hand sweeping.

Section Schedule No. 1.—A separate schedule for each section will show the number of sweepers and cart drivers employed, as shown in district schedule No. 1, which will serve as a basis for ascertaining the proportion of the salaries of the section foreman and assistant foreman chargeable respectively to "sweeping" and "carting."

The sweepers are paid bi-monthly. The total so paid during the month as obtained from the payroll clerk will be reduced by the amount paid for hose flushing as reported by the section foremen and entered on Table No. 5, and the percentage such reduction bears to the total paid to sweepers, will be used as a basis of estimating the proportion of the salaries of the section foreman, assistant foreman and section station keeper, which will be chargeable to hose flushing. The amounts of these three deductions will be grouped separately and shown on the schedule as the payroll cost of hose flushing for the section.

District Schedules Nos. 2 and 3.—These schedules will show separately the items of equipment cost of "Machine Sweeping," "Street Sanding," "Sprinkling to Lay Dust" and of the "District Superintendent's Horse and Buggy," and will begin as to each of the items with the daily average district equipment taken from Stable Schedules Nos. 1 and 2. The prices of each item of district equipment as furnished by the property clerk will afford a statement of the total cost of the plant, from which interest on investment at 6 per cent. per annum will be computed.

Depreciation will be the next cost item shown, the property clerk furnishing information as to the estimated life of each item and the proportions will then be ascertained.

The cost of maintenance of horses will be ascertained by applying the percentage of the daily average number of horses of the district to the forage cost for stable "K" supplied by the property clerk, and to each of the items of "Salaries and Wages of the Stable Force," "Medicine," "Supplies and Repairs" and "Gas Light and Electric Light and Power."

The gross cost for each class of articles repaired will be obtained from the chief bookkeeper, and the number of articles repaired for the district from the master mechanic. The figures for the preceding year if necessary may be taken as furnishing a fair average rate.

A summary of the four items of "interest," "deprecia-

tion," "maintenance of horses" and "repairs to plant" will then be made as to each of the equipment items of these schedules. The cost of equipment for each class of machine activity will be distributed separately by sections on the basis of the number of square yards, while the cost of the district superintendent's horse and buggy will be entered as before stated, on district schedule No. 1, as an item of district expenses.

Ascertaining the Daily Average Number of Horses and Vehicles.—The number of horses and vehicles in the stable as shown on the daily stable reports will be tabulated for the working of the month.

The tabulation will show the daily average number in use in each section or for each special purpose, also the number not in use; and the number in use will be increased by a percentage distribution of those not in use, so that the whole burden of expense will be charged in the cost.

Stable Schedules Nos. 1 and 2.—The results of this tabulation will be applicable to the cost of each class of machine work and "District Superintendent's Horse and Buggy" by means of stable schedule No. 1 as to horses, and stable schedule No. 2 as to vehicles. From these two schedules the daily averages and percentages used in district schedule No. 2 will be obtained.

The stable schedules show that the stable activities are independent of the district activities. Stable "K" cares for the horses and carts of three sections of district No. 9, and also three sections of district No. 11, the sweeping machines and sprinklers of both districts, the horses and buggies of the superintendents of the two districts and the hill horses used on some of the dumping stations.

Section Schedule No. 2.—The cost of equipment for the section stations will be supplied by the property clerk, the total serving as a basis for calculating the interest charge.

The depreciation will be obtained from the records of the repair shops and of the property clerk.

The cost of repairs will be ascertained in the same way as described for district schedule No. 2; but, as the figures furnished are for the district only, the total will be distributed by sections on the basis of the number of sweepers employed.

The cost of interest and depreciation of equipment for hose flushing will be shown separately in this schedule.

Section Schedule No. 3.—This schedule will show the final cost of operating each section, presenting separately the cost of "Hand Sweeping," "Hose Flushing," "Machine Sweeping," "Street Sanding" and "Sprinkling to Lay Dust."

Taking from district schedule No. 1 each section's functional proportion of district expenses and adding successively the payroll cost of operating the section taken from section schedule No. 1; rent of section station; and the estimated cost of equipment and repairs from section schedule No. 2, the total will give the final cost of "Hand Sweeping," "Hose flushing" and of each class of machine activity.

From schedule No. 3 of each of the four sections will be obtained the figures set up in "Unit Cost Exhibits 'A' and 'B.'"

SNOW SWEEPER AND SCRAPER IN OTTAWA.

The street car company in Ottawa, Canada, is required to remove the snow from the entire roadway of every street through which it passes, and in doing so uses a combined sweeper and scraper, operated on its tracks by trolley. This car starts out as soon as the snow has reached any depth and continues going over the line as long as the snow falls. Under the front of the car is a

revolving broom which throws the snow to the right of the track, and at the center of the car is a scraper blade which extends 14 to 16 feet out from the side and piles the snow along the gutter. This scraper wing can be set at any angle from 45 to 15 degrees, depending on the resistance of the snow or width of street. It consists of a heavy beam 18 inches high and 3 inches thick, provided with a steel edge and fastened at the inner end to the bottom of a pivot rod, from the top of which a tie rod extends to the outer end of the scraper. The scraper can be raised or lowered or its angle changed at will by the operator. After being piled in this way, the snow is carted away in the ordinary fashion.

SEATTLE'S PUBLIC MARKET.

There is a municipal market in Seattle, Washington, within two or three blocks of the busiest part of the city. This is under the supervision of the Health Department. In an effort to decrease the high cost of living to the citizens, the officials decided to try the public market, and in looking about for a location, finally decided upon using a strip about 20 feet wide lying between the edge of a side-hill street, and a retaining wall constructed in connection with it. Here a shed was built about 300 feet long, constructed of concrete and sheet metal and open in front, but enclosed at the rear, which overhangs the retaining wall. In this were placed 194 tables, each 3 feet wide and 5 feet long, constructed of pipe and galvanized iron. One row of these is placed under the shed, and another row along the edge of the curb, the latter being used by Japanese and Italian farmers for the sale of fresh vegetables, and the former by "white" farmers who sell meats, butter, eggs, poultry, honey and home-made canned goods of various kinds. The cost of this shed complete was about \$13,500.

When the success of this market had become evident, an unoccupied part of an adjoining block of ground owned by private parties and part of it used by them as a private market was also arranged for general public use. The owners have recently built an arcade the entire length of the market, and under this the farmers are assigned a row of tables facing the private booths. The rentals from these farmers' tables go to the city, the benefit to the private market being the additional throng of customers it attracts to its vicinity.

These markets are in direct charge of two city inspectors, who see that they are kept clean and orderly, and that only clean and wholesome food is offered for sale. The cost of janitor service and other expenses of maintaining the markets amounts to about \$300 per month. To meet this expense a charge of 10 cents per day is made for the tables. Several farmers have said that they would not object to paying 50 cents or \$1 a day if this were demanded. Each day the farmers are assigned to tables by lot. All the tables are numbered, and each farmer draws a number from a reel carried by the inspector, generally before leaving the market the day before. Some of the tables are considered to have a more desirable location than others, and the object of this system is to give each farmer as far as possible an equal opportunity at these tables.

The only farmers who are allowed to use this market are those who raise the products which they offer for sale. Before being allowed to use the market, a farmer must furnish the inspector with his name, postoffice address, description of the property upon which he lives and upon which he farms, the name of the owner, the number of acres, the kind of produce that he raises, and, if he leases, when the lease expires. He then receives a brass tag from the inspector containing a number corresponding to the number of his record, which tag

entitles him to a place in the market, and must be shown whenever called for by the inspector.

At the end of last March there were 572 checks of this kind held by farmers living in and around Seattle. Not more than 250 of these attend the market at one time, and when this number attend, it is necessary to erect temporary stalls to accommodate some of them. On some days the number of farmers falls as low as 50. As a rule, each farmer attends the market from once to three times a week, requiring the other days for working his farm. It is said that since the opening of the market the number of small producers around the city has increased fully 50 per cent, and the quantity of idle land in the vicinity of Seattle is now being opened up and cultivated as market gardens. Some of the farmers bring their produce as far as 25 or 30 miles.

The number who make purchases at the market at this time of year runs as high as 35,000 a day, it is estimated, and during the fruit season the number will run up to 50,000. The market is patronized by all kinds and classes of people, from the poorest to those who come in their automobiles. The total income for 1913 was \$5,529.20, and the total expense, including two inspectors at \$100 a month and one janitor at \$75 a month, printing and other expenses, was \$3,600; leaving a net profit to the city of nearly \$2,000.

GERMAN REFUSE CAN AND INCINERATOR

More Details Concerning System Used in Furth, Bavaria
—Pail and Wagon for Sanitary Collection—
German Refuse Destructor.

In our issue of January 8 we published some information concerning the cans and wagons used in the city of Furth, Bavaria, for the collection of garbage and the incinerator for disposing of the same. Since then we have obtained additional information about both, and believe it will be of interest to American officials.

The accompanying cut of the refuse pail shows the simple method employed for permitting the cover to slide back without becoming detached from the pail; and the photograph reproduced shows one of the large collecting wagons, drawn by a tractor which is coupled up with its two rear wheels raised above the ground. As the cans can be dumped into all parts of the wagon body, it is possible to fill this to the top without mechanically distributing the contents. As described in the article referred to, the cans are emptied without at any time bringing the contents of either can or cart into contact with the outside air. The tractors used in the Furth carts are electric, carrying 42 cells of 390 ampere hours capacity, giving a traveling range of 25 miles. The speed can be varied between $1\frac{1}{4}$ and 10 miles an hour. The batteries are charged at the power station by current generated by steam from the incinerator plant.

The prevention of all odors by never exposing the contents of the carts to the outside air is carried



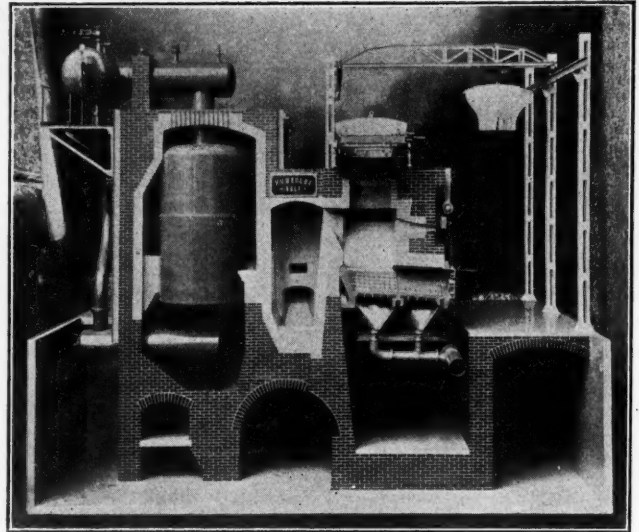
PAILS USED WITH THE OCHSNER SYSTEM.

throughout the entire system. The body of the collecting cart consists of a number of tanks which, when the wagon reaches the incinerating plant, are lifted bodily one at a time to a truck which runs on a track over the incinerator and which carries them to a point directly over any charging hopper. The tanks are arranged for bottom dumping and are discharged directly into the incinerator, the doors closed and the tanks returned by traveling crane to the collecting wagon.

The incinerators used are of the German type, the invention of J. A. Fried of Germany. One of the differences between this and the English type (which is becoming common in this country) is the smaller grate area and the deeper fire; another, that there are no openings through the bottom of the grate (in fact there is no grate proper) and no ash pit of the conventional type. Air for combustion is admitted through the sides and rear end of the grate (or hearth) and reaches the burning material with a slightly downward rather than upward movement, for which is claimed the advantage that it does not heave the fuel so as to form air holes, but rather forces it down. On account of this action, it is said that any desired intensity of draught may be used and adjusted to suit any conditions. No steam jets are used. Special provisions are made for clinkering which, of course, is a very important function with a grate of this kind. The clinker, as it is formed, is drawn down upon the fore grate, and the fresh air used for the combustion is passed over it and thus raised to a high temperature before reaching the main fire; this holding of the clinker on the fore grate also permitting the final burning of any unconsumed fuel which may be adhering to it. It is claimed as an important advantage of admitting the air above the fire rather than through it, that this prevents the CO gas from reaching the flue unoxidized.

Owing to this method of burning, the thickness of the refuse on the grate is not so important as where the draught is forced through the grate, and the material can be discharged into the furnace in large quantities without producing smoke. Charges are usually fed upon the main grate at intervals of about 20 or 30 minutes. As the interior of the mass heats up, distillation occurs and large quantities of CO gas are given off, but this is at once mixed with the heated air and oxidized. It is not necessary to open any doors for firing, but only for drawing clinker onto the fore hearth or removing it.

In a test of one of these plants made at Barmen in 1913, the material burned contained 1,440 B.T.U. per pound. The temperature does not appear to have been taken, but from the fact that particles of iron in the garbage were melted, it is assumed that the temperature reached 1,500 or 1,600 degrees centigrade (2,730 to 2,900 degrees Fahr.). In order to prevent particles of burn-

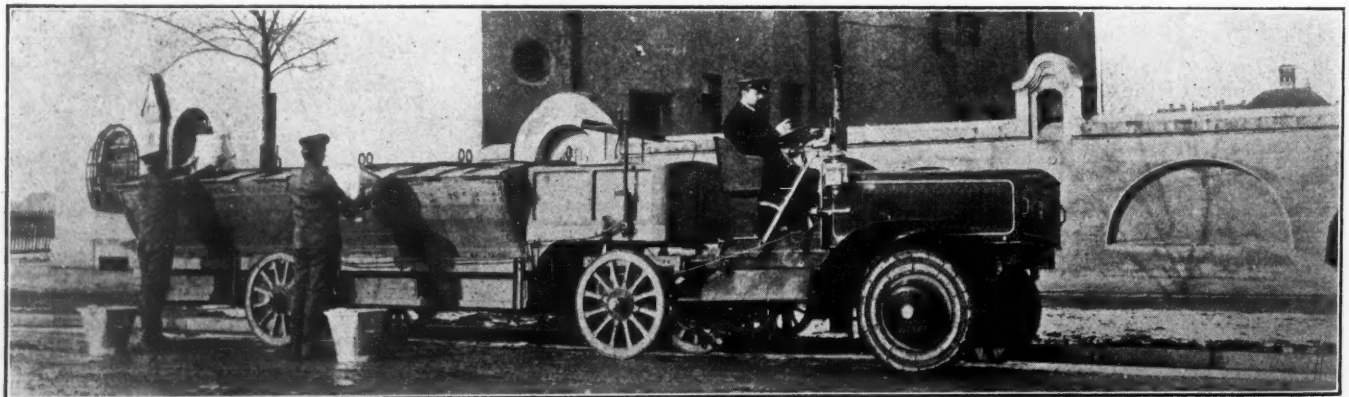


SECTION OF INCINERATOR MODEL.

ing ash from reaching and being deposited in the boiler tubes, vertical fire tube boilers were located as near as possible to the combustion cells. The ash passed through the fire tubes without being deposited there and was collected below the boiler, and it has not been necessary to clean the boiler tubes in five years of operation. The boilers furnished steam at ten or eleven atmospheres and 300 degrees centigrade superheated, at the rate of 1.3 pounds of steam per pound of refuse as a maximum, the average being about 1.03 pounds of steam.

The operating engineer, F. Junghans, reported that in the operation the average charge placed at one time on the main grate was 990 pounds. After about twenty-five minutes the mass was thoroughly burned and the slag from the previous charge, lying on the fore grate, was removed from the furnace, and the slag formed from the later charge was drawn forward to take its place. In some cases only twenty minutes per charge was necessary, or at the rate of nearly 3,000 pounds of refuse per hour.

The section of the model shown herewith explains the plant better than a photograph of an actual structure. The crane carrying a refuse tank is seen at the extreme right, while left of this is another tank being discharged into the furnace. The furnace grates are seen about halfway down the picture, the air ports showing in the sides of the grate, and the pipes for supplying the air being shown under the grates. The fore grate is shown at the right of the main grate. To the left of the main grate is the flue, and to the left of this the vertical tube boiler.



EMPTYING CANS IN REFUSE COLLECTION WAGON.

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CHANGE OF ADDRESS

Subscribers are requested to notify us of changes of address, giving both old and new addresses.

Contributions suitable for this paper either in the form of special articles or of letters discussing municipal matters, are invited and paid for.

Subscribers desiring information concerning municipal matters are requested to call upon MUNICIPAL JOURNAL, which has unusual facilities for furnishing the same, and will do so gladly and without cost.

MAY 14, 1914.

CONTENTS

Refuse Disposal in Regina. (Illustrated.).....	695
Fire Hazard from Incinerators.....	698
Geographical Street Naming.....	698
Street Railway Sprinkling.....	699
Chicago Refuse Disposal. (Illustrated.).....	701
Unit Costs of Street Cleaning.....	703
Snow Sweeper and Scraper in Ottawa.....	706
Seattle's Public Market.....	707
German Refuse Can and Incinerator. (Illustrated.).....	707
Unit Costs of Street Cleaning.....	709
Different Styles of Incinerators.....	709
Municipal News. (Illustrated.).....	710
Legal News—Notes of Recent Decisions.....	716
News of the Societies.....	717
New Appliances. (Illustrated.).....	719
Industrial News	722
Contract News	723

Unit Costs of Street Cleaning.

More and more students of municipal affairs and those who are endeavoring to secure greater efficiency in the conduct of municipal departments are becoming convinced, not only of the desirability, but also of the practicability of using unit costs as a basis of record and comparison. It illustrates the courage of their conviction and the earnestness of their purpose when we find so many of them attacking the problem presented by the street cleaning department, which, as we have several times pointed out, presents more difficulties in the way of calculating unit costs than most of the other departments which would come under the general head of public works. These difficulties are of two kinds—to determine upon units which are practical and useful; and to find some method by which reliable daily reports of work done and forces employed can be obtained from the foremen in charge of this class of work, since these are so often of less intelligence or at least of less ability to express even the simplest ideas with a pencil, than are those found in most of the other departments, such as waterworks, pavement construction, etc.

We have described in greater or less detail work which has been done along this line by investigators in two or three of the larger cities, and this week gives not

only an outline of a system recommended, but the actual figures obtained during five months' operation of the same, in a part of the city of New York.

The progress which has been made in this direction during the past year or eighteen months is certainly very encouraging, and gives promise that before long something like a standard system may be adopted for all of our cities and a comparison made of results as well as of methods.

Different Styles of Incinerators.

We have had occasion to describe several of the larger incinerator plants built in this country during the past few years, and most of these have been of the general type known as English. Three other types of incinerators are described in this issue; and in the Chicago report, which also is given, is a brief statement of the essential features of the different incinerators and of the different garbage utilization plants. The incinerators described are an American type without forced draught, an American incinerator using forced draught and using the heat for power purposes, and the German type of incinerator which uses forced draught, but passes the air over the burning refuse rather than through it.

It may be noticed that these show entirely different features of construction, but that each of them uses two grates or hearths, the refuse being drawn or falling from one to the other during the incineration process. In both the American furnaces the wet garbage is deposited on an upper grate to later fall or be drawn onto the lower grate where it is reduced to clinker. In the German plant the two grates are on approximately the same level, and practically all of the incineration takes place on the first grate, only the hot clinker and possibly a small amount of unburned material being drawn forward onto the second grate. In the English furnace described in our issue of March 12, there were two grates also, but in this case the refuse, when it had been burned to a clinker on the upper grate, was dropped onto the lower grate by pulling out the burning grate horizontally. Each of these plants also has in common the idea of using the heat from the clinker or the lower burning grate to heat the air or gases passing to the refuse which has not yet been completely burned.

Another idea which three of the plants have in common, and the fourth provides for when desirable, is that of utilizing the heat for raising steam. This idea seems to be made a prominent feature of almost all plans for modern incinerators, both in this country and abroad; in spite of the fact that, so far as we know, only one municipality on this continent has yet utilized this power to a sufficient degree to pay even for the additional expense incurred for power purposes only. Theoretically it is unquestionably possible to obtain considerable returns from incinerating plants in this way, and we have no doubt that before long cities, both those now operating such plants and those which may construct them, will find means to obtain a financial return from the plant in this way. The difficulty at present does not seem to be a mechanical one, but rather that through local conditions (political or otherwise), or through the absence of municipal charter rights or other legal interference, the power which may be, and in some cases actually is, created, is not being utilized profitably. But with German and American designers following the footsteps of the English, it would seem to be almost assured that the difficulties which stand in the way of utilizing the energy available in the incineration of rubbish will soon be overcome and this become not only a practical possibility but an assured fact of more or less common demonstration.

The WEEK'S NEWS

State Highway Work in New York, Wisconsin, Pennsylvania, New Jersey and Vermont—Sewage Disposal in Illinois Towns—Metering and Water Waste in Portland, Ore., and Ithaca, N. Y.—Auto Trucks in Many Capacities—Baltimore Market Ordinance.

ROADS AND PAVEMENTS

Patrol System Successful.

Newark, N. J.—That the patrol system of caring for county roads is a success was shown during the annual inspection of the highways in the southern and western part of the county by the roads and assessments committee of the Board of Freeholders. Approximately seventy-five miles of highways were toured, of which only a small fraction were found to be in a condition needing general repairs. The balance will require only minor repairs and careful supervision in order to maintain their integrity. This part of the work will, according to the freeholders and County Engineer Frederic A. Reimer, be done by the patrolmen. Inspection of the roads in these places indicated that almost all are in good condition, and show evidence of having stood heavier traffic than the roads in other parts of the county.



Courtesy Newark (N. J.) Evening News.
WORK ON NEWARK ROADS.

While the roads are in good condition, they need some repairing. Mr. Reimer said that of the roads controlled by the freeholders, approximating 160 miles in length, only about twelve miles will need general resurfacing. This is considerably less than the county had ever been called upon to resurface in any previous year. Edward M. Vail, State supervisor of roads, said that he had been going over Essex County roads for the last five years and that never before had he found them in such an excellent condition in the spring. The work preliminary to the repaving of Springfield avenue in Irvington is progressing rapidly. Laborers employed by the Public Service Railway Company were engaged in removing tracks from the side to the centre of the

road. This thoroughfare will be resurfaced with grouted granite under a contract awarded to the Newark Paving Company last year. Another recommendation which will be an outcome of the inspection tour is one calling for the rebuilding of five inter-county bridges connecting Essex and Morris. This work, it is believed, can be done at an expense not exceeding \$75,000.

Start Work in Billings, Mont.

Billings, Mont.—Work on the laying of 17,035 square yards of paving on North Twenty-seventh street has been begun by Hanlon & Oakes and the Warren Construction Company, who have the contracts for the paving of a district extending from Third to Ninth avenues. The contractors express themselves as confident that the work will be completed before July 1, the stipulated time. The southern portion of the district is to be paved with wood blocks by Hanlon & Oakes. This district comprises 5,270 yards. The Warren Construction Company will pave the northern half of the district, comprising 11,765 yards, with gravel bitulithic. Both contracts call for the paving of intersecting half blocks.

Hutchinson, Kan., to Test New Grader.

Hutchinson, Kan.—A new style grading and ditching machine which has been built in Hutchinson has been given its first workout. F. A. Manda and M. Westenhaver are the designers of the machine, which was built at the Hutchinson Foundry and Machine Works. The combined ditcher and grader is a huge affair, drawn by a 40-horsepower coal oil traction engine. On the frame of the grader another smaller coal oil engine is employed to run the dirt-moving and wagon-loading mechanism. The dirt can be dumped to either side of the road or loaded into wagons. The ditcher will take a bite into the ground 27 inches wide and 24 inches deep. It has a capacity of a cubic yard every time the machine moves forward 27 feet, and in eight hours will move enough dirt to equal the work for the same time of 75 men and teams, according to the advance plans of the makers. Provided the machine works in good shape the designers expect to take a number of contracts for grading and ditching over the southwest. The machines will be built in Hutchinson.

Butt Memorial Bridge at Augusta, Ga.

Augusta, Ga.—The Butt Memorial Bridge erected by this city to the memory of Maj. Archibald W. Butt who lost his life in the Titanic disaster has been dedicated. Major Butt was a native of Augusta and various organizations prominent in the city took part in the ceremonies.



Courtesy Washington (D. C.) Evening Star.
MEMORIAL BRIDGE TO MAJOR BUTT AT AUGUSTA, GA.

\$3,600,000 for Wisconsin Road Work.

Madison, Wis.—About \$3,600,000 will be spent in the construction of highways in the state next year. In a letter to the division engineers and county highway agents in the state, A. R. Hirst, state highway engineer, says that indications are that state aid will be more than called for again this year. He urges that the counties and towns keep down the appropriations so that the aid will not overreach a total expenditure of \$3,600,000. The state has already appropriated \$1,200,000 as its share of state aid for next year. The claim has been made that the members and employees of the state highway commission have contributed very largely to the tremendous amounts voted through their activity in requesting and promoting them, and Mr. Hirst asks that none of the employees exhibit any undue activity in this regard. Mr. Hirst has received replies from 667 towns, of which 421 voted taxes this year, which is 63 per cent of the total towns heard from. Of the total number voting taxes 325 voted taxes both years; 47 voted taxes in 1914 but not in 1913, and 160 voted taxes in 1913 but not in 1914. Of the same towns reporting in 1913 aid to the amount compared with \$327,766 this year, or of \$385,908 was voted last year as a reduction of \$58,142. The percentage of 1913 taxes voted by the same town in 1914 is over 82 per cent, according to the records of the state highway commission.

Vermont Returns to Gravel Roads.

Montpelier, Vt.—At a recent meeting of town road commissioners the new road policy of Vermont, just announced, was explained by State Highway Commissioner Gates. He intends to use the state appropriation of about \$250,000 in building trunk roads, and to spend funds amounting to more than \$75,000, derived from motor vehicles, in keeping the most traveled routes in repair. He will abandon macadam and other types of expensive construction, and return to earth and gravel road-making on the less traveled highways.

Prosecute Council for Bad Streets.

Gilberton, Pa.—Court has ordered the prosecution of the borough councilmen of Gilberton for failure to repair the streets of the town. The council let the work out to a contractor, but court said this did not lift the responsibility from the councilmen. It is said some of the streets are being filled in with coal dirt from the culm banks.

New Equipment for Delta County, Mich.

Escanaba, Mich.—The Delta county roads commission is getting started with the work that is to be done this year. R. P. Mason, county engineer, says that the board has under its jurisdiction 195 miles of county roads, of which 164 miles is earth road and 31 miles is macadam. The board has purchased the following equipment: One 8-ton Koppel locomotive, 40 1½-cubic yard Koppel dumping cars, one 16-foot flat car, 2¾ miles of 20-pound, 24-inch gauge track, complete in 15-foot sections, with steel ties, two 10-ton gasoline rollers, second-hand; one sprinkler, second-hand; one small road machine, second-hand; one elevator for unloading stone from the standard cars into our equipment. With this outfit a large portion of the expense of delivering the stone on the road will be eliminated and a much greater mileage constructed than would be possible with methods heretofore prevailing. County Engineer Mason says that the board has ordered 18 new road drags, which, with the ones already in use, are expected to cover the county thoroughly. With these drags, in conjunction with a system of patrols, it is intended to maintain the earth roads in as good condition as possible for that class of road.

To Begin Work on Washington State Road.

North Yakima, Wash.—County Engineer H. F. Marble expects that Contractor S. Normile will be at work soon on the Yakima-Tacoma state road, on his six-mile job. In Mr. Marble's opinion it will take 200 men all of five months to do the work, and he does not believe it will prove practicable for the contractor to use a steam shovel, as he has announced his intention of doing. Civil Engineer J. E. Forman of this city has been appointed to represent the state while the work is in progress, and expects to go into the mountains shortly and remain there all summer.

Portable Asphalt Plant for Atlanta, Ga.

Atlanta, Ga.—A portable asphalt mixing plant has been purchased by the city for \$13,500, and hereafter the city, instead of purchasing its asphalt from the county, will mix its own. Purchasing Agent W. E. Chambers says that the plant will save the city between \$20,000 and \$25,000 annually. The machine was bought from F. D. Cummer & Sons, of Cleveland, under a five-year guarantee bond. It is due to reach the city next week.

Improve Historic Road.

Baltimore, Md.—Since about the first of last July one of the largest and most important street improvements in the history of the city has been in progress on the Reisterstown road, beginning near Fulton avenue and extending to the northwestern entrance to Druid Hill Park. The work is being done by Patrick Flanigan & Sons, under a contract from the State Roads Commission, and the contractors expect to complete the grading in this area in a short time. In order to make this improvement it was necessary to remove a large portion of high hill at the northern boundary of Mondawmin. For this work the contractors engaged three giant steam shovels, each with a capacity of about three-quarters of a cubic yard of earth. Approximately 72,000 cubic yards of earth and rock were removed in this huge excavation. Several hundred men have been engaged on the work of grading, removing the car tracks, lowering water and gas pipes and other changes incident to changing the grade of the street. In order also to remove the large portion of the hill it was necessary to do a great deal of dynamite blasting, in the course of which there were several minor accidents. A sub-contractor was awarded the paving



Courtesy Baltimore (Md.) News.

CONCRETE PAVING AT BALTIMORE.

work and owing to the good weather during the early part of the winter much of this work has already been finished. It is expected that the paving will be entirely completed about July 1. At the intersection of Reisterstown road, a portion of which is shown in the illustration, Park Heights avenue and the northwestern entrance to Druid Hill Park a large circle is being laid out, comprising a radius of 183 feet to the building line at the northwest side of it and with a center diameter of 166 feet. Around this center will be a 60-foot asphalt drive, and at a later date it is proposed to have the south-bound cars of the United Railways skirt this central portion of the circle. The circle will be parked in the center with flower beds and shrubbery, and will be maintained by the Park Board as a part of the city's park system. The circle will be accessible by Reisterstown road, Woodberry avenue, Park Heights avenue, Dukeland avenue and Sequoia avenue. When the work is completed Reisterstown road, from Elgin avenue to Liberty Heights avenue, will be 95 feet wide from building line to building line on either side, 16 feet in the center being devoted to street-car area in which granite blocks will be laid. On either side of the car tracks sheet asphalt is being laid on a heavy concrete base, affording a 19-foot driveway on both sides of the tracks, the asphalt sloping toward each gutter with a grade of 6 inches. The total cost of the improvement will

be about \$350,000. At a cost of \$60,000 a bridge will be constructed from the park circle over the road that now runs along the boundary line of the park.

New Jersey Cannot Take Over Roads.

Trenton, N. J.—The work of taking over the main highways of the state, known as the "Blue routes," and creating from them the state highway system under the act of 1913, will have to be deferred at least one year, owing to the depleted condition of the state treasury. This was shown at a meeting of the State Highway Commission. Governor Fielder is a member of the commission, and the meeting took place in his office. The others present were State Road Commissioner Edwin A. Stevens, who is secretary; State Treasurer Edward E. Grosscup and Senate President John W. Slocum. Commissioner Stevens presented a report showing that the act of 1913 carried an appropriation toward the establishment of the state highway system of \$250,000, which, however, never became available, as no provision was made for it in the appropriation act. Owing to a lack of funds, Colonel Stevens pointed out, the work on the system during the past year had been limited to the survey, searching of the titles and other preparations for taking over of the roads to be included in the highway system. The taking over of the roads from Jersey City to Camden, with a branch extending from Rahway or Elizabeth to Point Pleasant, and from Camden to Atlantic City, with a branch extending from Absecon to Point Pleasant or Lakewood, would give a total mileage of about 240, or approximately one-half that described in the act of 1913. The total cost of taking over these roads and putting them in the shape in which they could be administered in the most economical fashion is estimated at about \$860,000.

Resume New York State Work.

Rochester, N. Y.—An active resumption of road construction work in Highway Division No. 7, which includes Monroe, Orleans, Genesee, Wyoming, Livingston and Ontario counties, is now in progress. In each of the named counties new highway construction has been started, and by the end of the season 46 miles of improved highways will be added to the roads. Grading work on the Little Ridge road, in Monroe county, west of Clarkson, has been started, preparatory to laying 3.83 miles of water-bound macadam. West of Brockport, 3.23 miles of concrete road is to be built. Barnard's Crossing is being prepared for 1.61 miles of bituminous macadam. Batavia, in Genesee county, is to have a brick pavement two miles long, and work has been started on the Livonia South road, which is to be 4.17 miles long and constructed of macadam. Work has also been started on 4.04 miles of road through Livonia and Dansville, in Livingston county. One of the big jobs of the division is known as the Hartland-Medina road, six miles long, and will be built of concrete. The biggest job to be undertaken by the division is the Warsaw-Granville road, 8.89 miles long. It will be composed partly of brick and partly of bituminous macadam. The brick will be in that part of the road which runs through Warsaw. The cost will be \$116,000. In addition to the work already begun, bids have been advertised for work on the West Henrietta-West Rush road and Fairport-Nine Mile Point road, in Monroe county.

Steam Shovel As Election Plank.

Atlanta, Ga.—J. W. Maddox, a contractor, is running for the office of county commissioner of Fulton County, making the issue of economy in road construction very concrete by bringing in a steam shovel. In large space advertisements, in which he asks for votes, he compares the present convict-labor system of road building with the economy of the steam shovel which he is using. The job was excavating dirt and hauling it away. The county had 28 convicts at work with pick and shovel. Mr. Maddox estimates that the convicts cost 37½ cents, or a total of \$10.50, per day for food, clothes and housing; two guards and a foreman cost \$5 per day, and \$4 per day for blasting powder brings the total up to \$19.50. Eight wagons were used, and but one was idle because of delay in loading. Mr. Maddox, with his steam shovel, estimates that fuel and oil cost him \$2 per day; interest and depreciation on

shovel, \$1.20; engineer and fireman, \$6.80. This makes the total operating cost \$10.50 per day. But in his work all eight wagons were busy, and therefore the comparative cost was only \$8. On this \$8, compared with \$19.50, Mr. Maddox bases his claim to election.

SEWERAGE AND SANITATION

Reports on Electrical Treatment of Sewage.

Rochester, N. Y.—Consulting City Engineer A. Fisher has completed his report on the inspection of the electrical process for the disposal of sewage and submitted it to the Mayor. Mr. Fisher declares that if statements made by Wm. B. Fuller, a new York Engineer, in regard to the model plant at Elmhurst, which was inspected by Acting City Engineer F. T. Elwood, the Mayor and Secretary Bernard J. Haggerty, are true, this new electrical system will revolutionize sewage disposal. In part Mr. Fisher's report reads as follows:

"The processes heretofore used for the electrical treatment of sewage, which have resulted in any material improvement thereto, have been so expensive as to be absolutely prohibitive. This process as described by Mr. Fuller, differs entirely from any heretofore used, and if the claims made for this method are borne out by actual experience with plants of sufficient size to fairly test the process, this system will revolutionize the practice of sewage disposal. While the system as described appears to possess great merit, especially for plants where a high degree of purification is required, it would seem to be unwise, in view of the fact that it has nowhere been used, to consider its installation at the present time in our main plant. I would, however, recommend and have suggested to Mr. Fuller, that he make up a tentative plan and estimates for the disposal of the sewage in the Brighton district by this method, and also at the Lake Avenue Outlet sewer."

Propose to Change Map of New York City.

New York City, N. Y.—The somewhat startling changes in the topography of New York proposed by Dr. T. Kennard Thomson have again come in for further discussion in connection with the various sewage disposal plans proposed for the city. Dr. Thomson says that the rivers and harbors of the city are becoming cesspools because the sewage has no easy way of getting out. He claims that his plan of joining Manhattan to Long Island by filling in the East river would allow of great trunk sewers from White Plains down where the East river now is, thence to Staten Island, picking up all the Jersey sewage, and then on, miles beyond Sandy Hook, where it can be properly treated. By the construction of a new neck of land from the Battery to within a mile of Staten Island and the connection of the Island with New York by tunnels, Dr. Thomson said that Staten Island would in reality become "Greater Pittsburgh" when the barge canal was completed, making it possible to get ore here as cheaply as in the Pennsylvania city. He added that "The project will involve spending at the very least for sea walls, docks, streets, skyscrapers, subways, trolleys, electric light and power lines, warehouses, dry docks, sewers, boulevards, parks, and the like \$50,000,000 a year for labor and \$50,000,000 a year for materials, keeping every transportation company in the country busy bringing in material and every industry in the city busy, feeding, clothing, marrying, burying, insuring, and otherwise looking after the needs of the new population, which, added to the present, soon will be 25,000,000 in a radius of 25 miles from New York City Hall."

Illinois Towns Submit Sewerage Plans.

Chicago, Ill.—The Illinois Rivers and Lakes Commission has issued a statement emphasizing the need of adequate sewage disposal facilities in Illinois towns and pointing out many flagrant examples of polluted water supply from contaminated streams. The state has undertaken to assist cities and towns to solve their water supply problems through this commission which is acting under a law effective July 1, 1913. Long extended drouths which have afflicted Illinois in very recent years, together with rapid growth of city population, have forced to the front the serious problems of water supply which practically every city in the state today faces. Arthur W. Charles, chairman of that commission, said: "The condition is emphasized along the Fox and Sangamon rivers, particularly the former, where there are a large number of

growing towns situated only a few miles apart, and where the down river towns are offended by the pollution of the towns above them. Along Fox river evidence shows that at points where the pollution is very bad, ice is cut and stored. The commission has made inspections along these rivers and has held a number of hearings. Complaint was made of pollution of the Fox river by sewage from Elgin, Aurora, Geneva, Batavia and St. Charles. As a result of the testimony offered, the commission has ordered each to file, in its office, by May 10, 1914, complete plans for the installation of a system for the treatment of raw sewage before it is emptied into the river. Trade waste from various factories along the river was found to be a contributing factor, and the proper officers of the factories were notified to present some scheme for preventing pollution. In most cases the commission has found the towns willing to abate the nuisance, but in nearly all instances the inability to raise the funds is the obstacle. At Aurora, a city of 30,000 inhabitants, on the Fox river, the authorities agreed to submit plans at once for a remedy. St. Charles and Elgin farther up stream, against which complaint was made, have submitted plans for sewerage reduction. Decatur, on the Sangamon river, presents a very difficult problem. The city has 40,000 people and is rapidly growing. The pollution at that place is very bad. As soon as the commission learns of the intention of any town to install a sewer system or make changes in sewer matters, it at once requests a copy of the plans for taking care of the sewage. Under a co-operative agreement with the state water survey, the latter passes on the feasibility of the plans. The commission advises all municipalities contemplating sewer construction to be governed by a reasonable regard for the future growth of the town and to include in its plans some scheme for the purification of the sewage. During the last few weeks the following towns in the state have submitted plans for sewerage system for approval: Moline, Alton, Freeport, Benton, Peotone, Genoa and Rankin."

Test Sewer Cleaning Machine.

Fort Wayne, Ind.—Mayor Hosey, Messrs. Kelly and Hilgeman, of the board of works, City Engineer Randall and Street and Sewer Superintendent Herman Strodel have viewed a demonstration of a sewer cleaning machine brought here from Milwaukee by Elmer E. Bisel, former street superintendent. The operation was in charge of W. J. Stevenson, who came here to make the demonstration. The machine, a Stevenson improved sewer cleaning machine, was put in the 24-inch sewer. The cleaning was successful and took a large mass of dirt from the sewer. About an hour was spent, after the machine was installed, in cleaning 250 feet of sewer. The mayor and board are pleased with the work of the machine.

State Health Code in Effect.

Rochester, N. Y.—The section of the State Health Code relating to communicable diseases, drafted by the State Health Commission, has now gone into effect. In cases of any diseases but smallpox it will no longer be required that houses be placed under the quarantine restrictions. In cases of scarlet fever the houses where the patients are will not have to be placarded, according to city officials, and persons may go to and from them without interference. The provisions of the local health code relative to communicable diseases are now inoperative and the city is now governed in this respect by the provisions of the state code. The state code calls for isolation and provides that a violation of the isolation rule is a misdemeanor. In other words, patients suffering from communicable diseases must be placed in a room and others in the household not permitted to enter or come in contact with the patients. In case any except the nurses or attendants do enter the room it is a violation and if proved an arrest may be made. The ordinance formerly governing this in Rochester provided for quarantine, but did not make a violation a misdemeanor.

Sewer Flood Endangers Twenty.

St. Paul, Minn.—Twenty men employed in the big Sommerville sewer tunnel, narrowly escaped death when a torrent of water suddenly filled the chamber to a depth of five feet, and rushing through the tunnel, swept them

to the mouth of the sewer, more than a quarter of a mile distant. The men saved their lives by clinging to the heavily laden work cars, which were carried to the outlet by a thirty-mile current. The story of their narrow escape became known when a report was made to City Engineer Claussen. Officials of the city engineering department, anticipating the sudden flooding of the tunnel because of the recent rains, had warned the crew to be cautious. The men were anxious to finish a piece of work more than a quarter of a mile inside the tunnel, however, and persisted in continuing operations even after the water had begun to rise at a dangerous rate. The St. Anthony Park territory is drained by the Sommerville sewer, and because of the hilly character of the district the feeders pour great quantities of water into the main sewer after a heavy rain. As the men abandoned their task and started toward the outlet the flood swept upon them. The men were unable to maintain their footing against the swift current, and the foreman shouted a warning to cling to the work cars. There were two of them, heavily laden with brick and as they were carried down a 2 per cent incline by the swift current the workmen hung on and saved their lives. The flood water filled the big chamber, subjecting it to a bursting pressure and causing damage to some portions.

WATER SUPPLY

Claims Federal Work Causes River Pollution.

Waukegan, Ill.—That the water used in this city is being polluted with poisonous substances, through an action of the United States government in ordering the dumping of the refuse, being removed from the Waukegan harbor, at a point near the regions of the city pumping station intake, in the lake, was stated in a complaint just filed by an official of the water department. It is stated that the refuse which is being taken out of the harbor by the dredge now at work is being carried out on a scow to a point several feet southeast of the intake. There it is being dumped into the lake. Recently the wind has been in the southeast and the direction of breezes has served to convey the particles of refuse to the mouth of the pipe. The daily analysis of the water at the pumping station displays the basis of the complaints for it shows a large increase of bacteria in the water, beginning on the day that the government began the activities of removing the refuse from the harbor. Chief Waterworks Engineer W. J. Allen stated in his complaint that he had been forced to use "hypo" in much large quantities than formerly. Harbor Master Carson, however, stated the question of pollution had been considered by the government engineers before beginning work and he thought that no pollution was possible. It is expected that the city will ask that the refuse be dumped at some point north of the intake or somewhere further south.

Investigating the Chlorine Process.

Dunkirk, N. Y.—Mayor John T. Sullivan, ex-officio head of the Board of Health, Water Commissioner J. C. Henderson and Supt. W. O. Peck of the water works have visited Erie, Pa., for the purpose of investigating the results obtained with chlorine purification of the water after the typhoid epidemic in that city some time ago. The purifying process is claimed to have been very successful in Erie. It is very probable that the method will be used in Dunkirk. The situation here is grave. Sixty new cases of typhoid have been reported since the first of April. There has, however, been no analysis of the water made for three or four months.

To Stop Huge Water Waste.

Portland, Ore.—Steps are being taken to stop the waste of nearly 1,000,000 gallons of water each 24 hours through leaks in the two Washington Park reservoirs, according to Commissioner Daly, of the department of public utilities. It will be necessary to repair one of the reservoirs at a time, permitting the other to remain full of water to care for the water consumption of the West Side. It will take several weeks, it is said, to complete the work. These leaks have been in existence for several years, and were caused by the slipping hillside on which the reservoirs are constructed. After the reservoirs were first built, the hill-

side slipped considerably, and their linings were almost completely destroyed, necessitating their reconstruction. Tunnels were then driven into the hillside to carry away the surface drainage, as the movement of the hillside was believed to be caused by the saturation of the earth with water. Before this work was finished there was another slight movement, causing some of the reconstructed slabs to crack. The tunnels have had the desired effect in stopping the slipping of the earth, and since the movement has ceased it has been decided to repair the shattered sections of lining. While the loss of water through the cracks has been considerable, it never has been considered a serious matter heretofore; but in view of the fact that the water consumption has become so great on the West Side, and the reservoir capacity so limited, it is now considered absolutely necessary to make the repairs. Chief Engineer Clarke, of the water bureau, will have charge of the work, which will be started immediately. The broken slabs will be removed and replaced with water-proofed material. It is believed that the loss of water from the two reservoirs will be reduced to a minimum with the completion of the repairs.

Metering for Ithaca.

Ithaca, N. Y.—The Board of Public Works has ordered that all consumers be put on a meter basis before November 1 of this year. Meters are being installed as rapidly as possible and as it is impractical to install such a large number of meters all over the city within a short period, there will be no change made in the regular bills sent out May 1 for the six months in advance to November 1. After all consumers' lines are metered it has been decided to divide the city into three zones or districts. At some period this fall a new schedule of meter charges will be put in effect and consumers who have paid for water on the flat rate basis of November 1 will be rebated from the time the Board of Public Works decides to put the meter rates in effect until November 1 at the proportionate rates charged.

STREET LIGHTING AND POWER

Public Service Commission Disapproves Competition.

Harrisburg, Pa.—The Public Service Commission of this state has handed down a decision denying the application of the Schuylkill Light, Heat & Power Company for permission to carry on a competitive electric lighting business in the borough of Ashland, now served by the Eastern Pennsylvania Light, Heat & Power Company, the subsidiary lighting company of the Eastern Pennsylvania Railways Company. The commission held "that a reliance upon competition between public service companies for securing adequate service and proper rates has not been successful and that hereafter supervision by properly constituted authorities is to be substituted"; that competitive companies are invariably merged and the citizens are compelled to pay rates sufficient to give a return on the investment of duplicated properties. This was the first case of its kind before the Public Service Commission of Pennsylvania and its decision is of very great interest to all public utility properties in the state.

New Lighting for Warsaw, N. Y.

Warsaw, N. Y.—The village of Warsaw has signed a contract with the Warsaw Gas and Electric Company for the new lighting of the business section. The contract provides for at least 10 inverted arc lamps mounted on poles or pillars. All the poles and wires in Main street will be removed and the new wires will be placed in conduits at the outer edge of the sidewalk. In making the change the village will stand part of the expense. This contract also provides for 55 more 40-candlepower incandescent lamps in place of the 35 50-watt tungsten lamps and 25 or more arc lamps for lighting the other parts of the village, the arc lamps to cost \$75 per year.

Big Gas Combine in Ohio.

Columbus, O.—Organization and financing of a new \$20,000,000 gas company is announced by the Columbus Gas and Fuel Company by President B. G. Dawes. It will be known as the Ohio Cities Gas Company, and, according to Mr. Dawes, will make possible a more efficient and central

management of the Columbus Gas and Fuel Company, the Federal Gas and Fuel Company, the Springfield Gas Company, the Columbus Oil and Fuel Company and the Columbus Producing Company. Its authorized capital stock of twenty millions is divided into \$10,000,000 preferred and \$10,000,000 common, but for the present \$7,250,000 of preferred and \$5,500,000 common will be issued. The remainder will be held in the company's treasury. It is calculated that the per meter capitalization of the Columbus Gas and Fuel Company is \$300, while that of the Ohio Cities Gas Company is about \$170.

FIRE AND POLICE

Auto Law Hits Fire Houses.

Lynn, Mass.—The members of the Lynn Fire Department hold that under the new law laid down by the State police, requiring cement floors wherever more than four cars are kept the Broad street engine house will have to be equipped with such a floor. The edict is a new one and will mean the laying of many cement floors throughout the State. At the Broad street engine house, there are six pieces of fire apparatus, including Truck 3, Chemical 1, Hose 4, Engine 4, the Lynn police and notification wagon and the chief's car. Engine 4, which has been under the process of being motorized with a Federal tractor A & B, has just arrived. Twenty-five hundred dollars has been appropriated by the Municipal Council to renovate the building, and it is likely an extra sum will have to be added to meet the demands of the new law. There is no clause, so far as the firemen can learn, in the law, which exempts municipal garages.

Test Hose Protector.

Sault Ste. Marie, Mich.—A number of citizens witnessed the test made in front of the Central fire hall of the patent hose protecting bridge invented and patented by Joseph Piche of this city. The bridge is made of forty pound rail and is nine feet in length. The apparatus which is intended to allow fire hose to be strung across the street at the time of a fire without interrupting the operation of the street car service, was pronounced a decided success.

Engine Beats Specifications in Test.

Wilmington, Del.—The new 750-gallon capacity straight gasoline engine, built by the Ahrens-Fox Company, of Cincinnati, Ohio, for the Fame Fire Company, was given a private capacity test, under the direction of Frank L. Brand, a member of the Fame company, and John Ahrens, a representative of the builders. The engine developed an actual discharge of 920 gallons per minute, 22 per cent. over the contract specifications. With the exception of some additional improvements, this engine is a duplicate of the one which carried off honors in a competitive test with ten other makes of engines in New York City during the fire chiefs' convention last fall. A public test, to which city officials will be invited, will be given very shortly.

MOTOR VEHICLES

Buys Rock Hauling Truck.

Bristol, Tenn.—The city of Bristol has just purchased a Garford four-ton motor truck, to be used in hauling rock from the city quarry at King's spring, for use in street improvement work. It is expected that motor transportation will prove cheaper than horses and will result in much saving. It has a steel body and an automatic dumping device. Sullivan County recently purchased a large truck of the same kind. The city of Bristol, Va., is considering the purchase of a similar truck. The matter has been referred to the street committee to report at the next meeting of the council.

Auto Trucks for Street Sprinkling.

Indianapolis, Ind.—The board of public works has placed inspection of street sprinkling under the supervision of B. J. T. Jeup, city engineer. Sprinkling inspection for many years has been under the supervision of the chief of the city assessment bureau, but the board believes the work properly comes under the jurisdiction of the city

engineer. Mr. Jeup says a rigid inspection will be maintained, and that he will report promptly any instances where sprinkling is not done properly, if any such instances are found. Four inspectors are to be assigned to the work throughout the season. A closer watch than usual is to be kept on street sprinkling, because M. J. McCarthy, the contractor, is experimenting with motor trucks. He has bought six trucks, which he believes will do the work of the 52 horse-drawn sprinkling wagons that his contract provides he shall have. The board consented to McCarthy attempting to do the work with six motor trucks, in place of 52 horse-drawn wagons, against the advice of Mayor Bell. There is no criticism of the motor trucks, for it is believed the trucks can do sprinkling properly if sufficient time is given.

GOVERNMENT AND FINANCE

Portland, Ore., Spends 115 Millions in Five Years.

Portland, Ore.—During the last five years municipal improvements and building construction in Portland have cost \$114,888,852, according to statistics compiled by City Auditor Barbur. Of this sum, \$20,888,657 has been expended in street and sewer improvements; water mains, Bull Run conduit, reservoirs, submerged pipe and other improvements to the municipal water system, \$5,523,138; bridges over the Willamette, \$2,098,138; bridges across gulches, \$166,505; fills across gulches, \$83,534. The cost of the bridges and a large percentage of the improvements to the water system have been paid from revenues derived from the sale of general bonds and are an obligation upon the entire city. Of the street and sewer cost, more than \$14,000,000 has been bonded by individual property owners whose property was directly assessed. These improvement bonds draw 6 per cent. interest, and one-tenth must be paid by the property owners plus interest each year. The general bonds draw 4 per cent. interest and have a life of 25 years to 30 years.

Courts Uphold Market Ordinance.

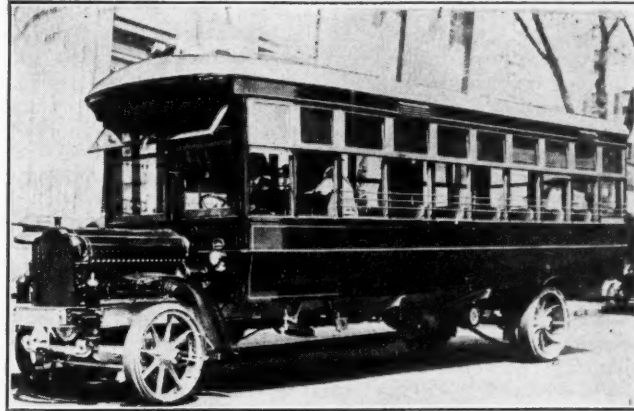
Baltimore, Md.—The city has won an important victory through a decision rendered by the Court of Appeals at Annapolis upholding the market ordinance passed by the City Council in July of last year, prescribing the regulations for the government and conduct of the city markets. According to City Comptroller Jas. F. Thrift, at whose suggestion, with the support of his deputy, William T. Childs, the market ordinance was passed by the Council, the victory won by the city through the decision means not so much in added revenue to the city from the markets, but the permanent continuation of the markets along modern lines, the costs of the future improvements to be paid from the added revenues. The case went to the Court of Appeals after Judge James F. Gorter, in the City Court, decided that several of the provisions of the ordinance were illegal and that the entire ordinance should be passed upon by the higher tribunal. The appeal was filed in the name of the Mayor and City Council of Baltimore and Comptroller Thrift against Edward Wollman and others, who brought the action in the lower court of the city to restrain the city from exercising the provisions of the market ordinance. The ordinance empowers the City Comptroller and the Board of Estimates to control the city markets as they have been previously controlled by the City Council, giving the Comptroller and the Board the right to regulate the rentals, clean and supervise the market places generally and to exercise full supervision over all market improvements. City Comptroller Thrift said that the decision will give the city between \$25,000 and \$30,000 more revenue each year. Had the lower court been sustained and the ordinance defeated there would have been a grave question as to whether the Comptroller's department would have been able in the future to make the necessary repairs to the markets.

RAPID TRANSIT

Auto Herdics for Washington.

Washington, D. C.—Plans for an improved service for patrons of the Sixteenth street herdic line are expected to be given the immediate approval of the public utilities

commission. Two new cars, like the one in the illustration, of double the seating capacity of those now in use, already have been placed in service by the Metropolitan Coach Company, which operates the line, and two others of similar type have been ordered, it is announced. The utilities commission has suggested several changes in the construction of the 'buses, which must be made before they will be approved. As compared with the present herdics, which have a seating capacity for 16 persons each, the new



Courtesy Washington (D. C.) Evening Star.
WASHINGTON'S NEW AUTO BUS.

vehicles will be capable of accommodating 32 passengers. They are of much heavier construction, which will reduce the amount of vibration, and are equipped with 60-horsepower engines. A single two-leaf folding door, giving access to double steps which are set into the car floor, is used both as an entrance and exit, and is operated by means of mechanism convenient to the driver's left hand.

Progress of New York Subway Work.

Brooklyn, N. Y.—Brooklyn is planning a borough-wide celebration on May 23 in honor of the beginning of work on some important parts of the new system. Work is progressing rapidly on many sections and prospects for early completion are very encouraging. Property values, meanwhile, are booming at a great rate in view of the improved transit facilities.

MISCELLANEOUS

To Make Lake Out of River.

Kingman, Kan.—Kingman citizens are agitating for a city beautiful. They want a municipal park, and the Ninnescah river, which cuts the town in two sections, has given them a novel idea. They propose to put in a dam and have a lake in the middle of the town. J. E. Ferguson and Mr. Welch of Kingman called at the court house to consult the highway engineer concerning a spillway. They said it is planned to build a spillway in the middle of the river bed and then throw up sand dams on either side of the spillway, so that in event of high water the dam will go out, preventing the flooding of the city.

Strict Traffic Rules for Pedestrians.

Nashville, Tenn.—Considerable amusement and confusion have been created around the uptown street crossing for some time through efforts of the traffic officers to educate pedestrians into the mysteries of the new traffic regulations, prohibiting crossing from one sidewalk to the opposite side of the street along routes other than the street crossings. Only the street crossings at the ends of the blocks are to be used when one desires to cross the street, and even then pedestrians must cross as nearly as possible at right angles. Many pedestrians have been puzzled by the actions of the traffic officers in refusing to permit them to cross diagonally, and some have even lost their temper at being forced to return to the street crossing and proceed to the opposite sidewalk at right angles. The confusion arising was anticipated to some extent, but as soon as the public becomes familiar with the new regulations governing pedestrians, no difficulty is expected to result in securing an enforcement of the law.

LEGAL NEWS

A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

Trunk Sewers—Assessment District.

Brown et al. v. City of Anacortes.—Under Laws, 1911, providing for the inclusion in trunk sewer assessment districts of all property which can be sewered or drained through the trunk sewers and subsewers connected therewith, according to topographical conditions, the fact that a tunnel may be necessary to drain certain property included within a trunk sewer district into the sewer, and that the property could be sewered by means of a separate sewer system at an expense of \$6 a lot less than by means of laterals connected with the trunk sewer in question, was not sufficient to show that the property was improperly included in the district.—Supreme Court of Washington, 139 P. R., 652.

Obstruction to Street—Injury to Traveler.

City of Georgetown v. Cantrill et al.—The primary negligence whereby one driving on a street was injured, for which he recovered against the city, being that of D., who had contracted to cut and remove trees by the side of the street, but negligently piled the wood in the street, and refused to remove when notified so to do by the city, it may have indemnity against him.—Court of Appeals of Kentucky, 164 S. W. R., 929.

Contract to Furnish Water—Defective Hydrants.

Tobin v. Frankfort Water Co.—A franchise authorized defendant private water company to furnish water to the city and its inhabitants provided that defendant should "furnish and set" 100 fire hydrants of modern pattern and good efficiency, that the hydrants should be rented by the city for five years; the city agreeing to use them carefully, and pay for any injury that might happen to them by any officer or servant of the city or member of its fire department. The contract further provided that the hydrants should be used only to extinguish fires and flush gutters and sewers, that the chief of the fire department should have control of them, should cause them to be inspected, and if, on inspection, any were found out of working order, defendant should be notified in writing, and was required to put such hydrants in effective working order with reasonable dispatch. Held, that the word "furnish" as applied to the duty to provide hydrants meant "provide at its own expense," and did not require the company, at its peril, to keep the hydrants constantly in working condition so as to render it liable to a citizen for a fire loss due to a hydrant being out of repair, without any notice having been given defendant thereof.—Court of Appeals of Kentucky, 164 S. W. R., 956.

Eminent Domain—Uses of Property for Reservoir.

Tracy et al. v. City of Mt. Pleasant, Ia., et al.—While the necessity or convenience of condemnor cannot be considered to compel the award of more than the fair value of the property, the owner may show that it is peculiarly adapted to the particular purpose for which it is sought to be taken. The owner of land condemned is entitled to its market value, as determined from all of the facts naturally affecting its value to purchasers generally, so that, in an action by a city to condemn land for a water supply, the owner can show that because of its being part of a basin adapted for reservoir purposes, the land would be regarded more valuable by persons generally than if it were not so located.—Supreme Court of Iowa, N. W. R. 78.

Sewer Assessments—Benefits—Property Liable.

Graham et al. v. City of Grand Rapids, Mich.—A special assessment can be made by a municipality upon property for the construction of a sewer, though such property does not abut the sewer, and has no actual connection therewith, if such property derives any special benefit from the construction. In a suit to enjoin the special assessment by a municipality for a trunk line sewer upon property not abutting, but located 2,000 feet therefrom, evidence

held not to show that the property received no special benefit from the construction.—Supreme Court of Michigan, N. W. R. 248.

Municipal Franchise—Streets—Power to Regulate.

City of Madison, Wis., v. Southern Wis. Ry. Co.—A municipality, with the broad powers of regulation as regards streets, may make reasonable regulations burdening a public utility using the street with the duty to make, at its own expense, reasonable changes in the physical condition of the zone so used, irrespective of anything contained in the public utility franchise, and this broad power is under disability to contract away.—Supreme Court of Wisconsin, N. W. R. 493.

Ballots—Irregularities.

Olsen et al. v. City of Lemomon, S. D.—In absence of express legislative provision, votes are not invalidated by mere irregularities by the officers in preparing the official ballots, if such irregularities do not prevent a free and fair popular vote or do not violate an essential statutory requirement.—Supreme Court of South Dakota.

Violation of Ordinance—Proof—Disposition of Appeal.

Town of Hammond, La., v. Baddeau.—Where a municipality is prosecuting one for a failure to comply with a sanitary ordinance, it must first show, by introducing its charter, that it had the power to pass the ordinance. If in such a prosecution the municipality fails to show that it had the power to pass the ordinance, the case will be remanded to permit the municipality to show that it had the necessary power to enact the ordinance in question.—Supreme Court of Louisiana, S. R. 803.

Eminent Domain—Necessity of Taking—Denial—Burden of Proof.

City of Chicago, Ill., v. Lehmann.—Whether the sovereign power shall be conferred upon corporations or municipalities to appropriate private property for public use is a legislative question not subject to review by the court, but whether particular property sought to be condemned is necessary for the public use is a judicial question to be determined by the court. Where a property owner in condemnation proceedings denies the necessity for the taking, the burden is on the petitioner to introduce such evidence as will at least establish a prima facie case of necessity, and failure to do this is fatal. While, in determining the issue of necessity for the condemnation of land for public use, deference will be paid to the determination of the corporation, yet, if it appears that the quantity of the property sought to be taken is grossly in excess of the amount necessary for the public use, the right to take will be denied.—Supreme Court of Illinois, N. E. R. 829.

Taxes—Recovery of Payment—Burden of Proof.

Lancaster Sea Beach Improvement Co. v. City of New York.—In a suit to recover taxes paid on the ground that the assessment was invalid, evidence held sufficient to show that a reduction of the assessment was passed upon by the board of taxes and assessments, and not by one commissioner only. A taxpayer, suing to recover a tax paid, on the ground that the assessment was invalid because reduced by one commissioner only, and not by the board of taxes and assessments, has the burden of proof. Where the formal tax record shows that a tax assessment was reduced by the board of taxes and assessments, the presumption against the contention that one commissioner only reduced the assessment, rendering it invalid, is very strong, and direct negative proof is called for.—Supreme Court, Appellate Division, Second Dept., N. Y. S. 734.

Obstructions on Sidewalk—Proximate Cause of Injury.

Younghood v. Madison City, Ia.—Where a building contractor had stored radiators for the building upon a sidewalk between its intersection with another walk and the street curbing, but had left the other walk open, such obstruction was not the proximate cause of an injury to a pedestrian who was tripped by a wire stretched around a plot between the sidewalks and the curb while he was attempting to cut diagonally across the plot.—Supreme Court of Iowa, N. W. R. 21.

NEWS OF THE SOCIETIES

Calendar of Meetings.

May 13-14.
AMERICAN SOCIETY OF CIVIL ENGINEERS.—Annual Convention. Baltimore, Md. C. W. Hunt, Secretary, 220 West 57th street, New York City.

May 14-15.
NORTH CAROLINA ASSOCIATION OF MAYORS.—Annual convention, Charlotte.

May 18-23.
FIRST CANADIAN AND INTERNATIONAL GOOD ROADS CONGRESS.—The Arena, Montreal, P. Q. G. A. McNamee, General Secretary, New Belks Buildings, Montreal.

May 20-30.
ELECTRICAL LEAGUE OF CLEVELAND, O.—Exposition, Coliseum, Cleveland, O. W. G. Rose, Manager, Illuminating Building, Cleveland.

May 26-28.
CITY MARSHALS AND CHIEFS OF POLICE ASSOCIATION OF TEXAS.—Twentieth Annual Convention, San Antonio. C. W. Newby, Secretary, Fort Worth.

June 1-3.
NATIONAL CONFERENCE ON CITY PLANNING.—Annual Meeting, Toronto, Canada. Flavel Shurtleff, Secretary, 19 Congress street, Boston, Mass.

June 1-5.
NATIONAL ELECTRIC LIGHT ASSOCIATION.—Thirty-seventh Convention, Bellevue-Stratford Hotel, Philadelphia, Pa. T. C. Martin, Secretary, 20 West 39th street, New York City.

June 2-5.
WISCONSIN GAS ASSOCIATION.—Annual Convention, Milwaukee, Wis. Hotel Pfister.

June 3-5.
CONFERENCE OF MAYORS AND OTHER CITY OFFICIALS OF THE STATE OF NEW YORK.—Fifth Annual Conference Auburn, N. Y. W. P. Capes, Secretary, 105 East 22d street, New York City.

June 15-17.
SOUTHEASTERN WATER WORKS ASSOCIATION.—Third Annual Convention, New Convention Hall, Tulsa, Okla. E. L. Fulkerson, Secretary-Treasurer, Waco, Texas.

June 23-25.
SOUTH CAROLINA STATE FIREMEN'S ASSOCIATION.—Tenth Annual Meeting and Tournament, Florence, Ala. R. S. Hovel, Secretary, Sumpter, S. C.

June 23-26.
SOCIETY FOR PROMOTION OF ENGINEERING EDUCATION.—Annual Convention. Prof. H. H. Norris, Secretary, Ithaca, N. Y.

June 30-July 4.
AMERICAN SOCIETY FOR TESTING MATERIALS.—Seventeenth Annual Meeting, Hotel Traymore, Atlantic City, N. J. Edgar Marburg, Secretary, University of Pennsylvania, Philadelphia, Pa.

July 3-4.
AMERICAN SOCIETY OF ENGINEERS, ARCHITECTS AND CONTRACTORS.—Midsummer Convention. Brighton Beach, N. Y. T. Hugh Boorman, Secretary.

Aug. 18, 19, 20.
FIREMEN'S ASSOCIATION OF THE STATE OF NEW YORK.—Geneva, N. Y.

Sept. 11-12.
STATE FIRE MARSHALLS' ASSOCIATION OF NORTH AMERICA.—Annual Convention, Asheville, N. C.

October 20-23.
INTERNATIONAL ASSOCIATION OF FIRE ENGINEERS.—Annual Convention, New Orleans, La. James J. McFalls, Secretary, Roanoke, Va.

Dec. 14-17.
AMERICAN ROAD BUILDERS ASSOCIATION Annual Congress and Exposition, International Amphitheatre, Chicago, Ill. E. L. Powers, secretary, 150 Nassau Street, New York City.

Municipal Engineers of the City of New York.

Last week, at the request of the board of directors, a paper was sent out, entitled "Valuation of Public Utilities," by Mr. N. S. Hill, Jr., consulting engineer, New York City. In his notice the secretary, Mr. G. S. Taber, asks that not only members of the society, but all who may be interested, submit a discussion of this subject, to be published with the paper in the Annual Proceedings.

The society will have an excursion by tugboat on Saturday, May 16, to the plant of the Phoenix Sand and Gravel Company, at Hempstead Harbor, Long Island Sound. Boat leaves Pier 6, East River, at Coenties Slip, Manhattan, at 1.00 P. M.

National Bureau of Municipal Research.

The 1914 municipal tour of Europe will be made under the direction of Mr. S. S. McClure, editor and publisher of McClure's Magazine. He is not only an experienced traveller, this being his one hundred and fourth Atlantic crossing, but he has for years made a special study of European governments in England, Germany, Switzerland, Russia, Spain and Italy. He is acquainted with the leading newspaper editors and city officials. Mr. McClure will undoubtedly make this tour one of singular value and interest.

International Engineering Congress, 1915.

The attention of engineers is being drawn to the program of the International Engineering Congress, which is to be held in San Francisco, Cal., in 1915. Interest has been aroused in foreign countries as is evidenced by the fact that there have been received enrollments and subscriptions from 42 such countries. Approximately 25 per cent of the total enrollment is from countries other than the United States. The percentage of subscription from the members of the five national engineering societies of the United States is not gratifying, for only 3.7 per cent of the total membership is presented by the subscription list.

Full information concerning program, etc., can be secured by addressing International Engineering Congress, 1915 Foxcroft Bldg., San Francisco, Cal.

Conference of Philadelphia Technical Men.

Engineering and scientific men of the city will start a new movement on May 15th at their meeting and smoker in the Continental Hotel Roof Garden.

Many local branches of the great national engineering and technical societies and other strictly local societies will be represented, including civil, mechanical, electrical, mining, illuminating and chemical engineers, chemists, electro-chemists and metallurgists, the Electric Light Association, the American Gas Institute, the Municipal Engineers' Society, the Engineer's Club, the Physics Club, the American Philosophical Society, the Society for Testing Materials, the Franklin Institute, Drexel Institute, the College of Physicians, the Engineering Department of the University of Pennsylvania, the Marine Draftsmen and others.

These many organizations number over five thousand men in their ranks in and near Philadelphia. The meeting to be held will be the first of its kind ever held here and will commence an annual series of conventions.

This meeting will be a combination of addresses, smoker and general good fellowship.

The program of addresses is as follows:

"Scientific Societies," by Dr. W. W. Keen, president, American Philosophical Society.

"Electricity in Modern Industry," by Dr. Charles P. Steinmetz.

"The Franklin Institute and the State," by Dr. Walton Clark, president, the Franklin Institute.

"The Engineer as a Factor in Modern Progress," by Dr. Alex. C. Humphreys, president, Stevens Institute of Technology.

"Engineering Societies," by Dr. James M. Dodge, past president, Society of Mechanical Engineers.

Technical League of America.

An organization with the above name has been formed by a merger of the Technical League of Engineers and the American Society of Engineer Draftsmen. Committees of the two former societies after careful consideration endorsed the following principles:

No discrimination can be exercised against any branch of architecture or engineering or any subdivision thereof.

No discrimination can be exercised against any grade of engineer or assistant which the necessities of the profession has brought or may bring into existence.

No discrimination can be exercised on account of geographical location.

The league invites members of existing societies as well as those belonging to no organization to affiliate with it.

North Carolina Municipal Association.

A tentative program for the meeting to be held at Charlotte, May 14-15, is as follows:

Mayor T. J. Murphy, of Greensboro, will make an address on city government.

The benefit of inspection by the fire department both to the city and the department will be the subject used by Capt. Sherwood Brockwell, chief of the Raleigh fire department.

Judge James S. Manning, of Raleigh, will speak on fire insurance.

Mayor Paul Jones, of Tarboro, will speak on municipal sanitation.

Extermination of the fly will be the subject dealt with by E. P. Wharton, of Greensboro, assistant health officer.

Mayor F. N. Tate, of High Point, will speak on freight rates.

Mayor J. E. Rankin, of Asheville, will speak on health departments.

Sewerage and disposal plants will be discussed by Gilbert C. White, civil engineer, of Durham.

E. L. Mason, chairman of the finance committee of Charlotte, will speak on city finances.

Mayor P. Q. Moore, of Wilmington, will make an address on street paving.

City playgrounds will be discussed by Mayor O. B. Easton, of Winston-Salem.

The meetings will conclude on the night of the 15th with a Dutch supper and smoker.

American Water Works Association.

The thirty-fourth annual convention meets in Philadelphia this week, the gathering of members, registering and other preliminaries taking place on Monday, and the business meetings beginning on Tuesday morning. By Monday night there had registered 100 active members, 74 associate members and 88 guests, 25 of the last from Philadelphia—an excellent showing for the preliminary day. By Tuesday evening this number had increased to about 600.

The quarters of the society on the first floor of the Bellevue-Stratford Hotel were most commodious, both for meetings and for exhibition of supplies. The two large rooms devoted to the latter purpose were necessarily traversed by all who wished to reach the audience hall, and the exhibits were well worth spending all the available time in examining.

On Monday the Executive Committee met and considered a few minor matters, and also considered and recommended amendments to the new constitution which the year's experience with it had shown to be desirable. These amendments were adopted by the convention on Tuesday morning as the first order of business, and caused the changed sections of the constitution to read as follows, the new matter being in heavy type:

"Article III, Section 6. When an Active Member so changes his vocation that were he to apply for membership he would be classed as an Associate Member, **he may continue as an Active Member with all the privileges of that grade, except that he shall not be eligible to any elective office of the Association.**"

"Article VI, Section 3. At least sixty days before each annual meeting of the Association the Secretary shall mail to each Active, Honorary, or Corporate Member a blank upon which the member may express his choice for President, **Vice President**, Treasurer and two Trustees. The Secretary, in conjunction with two other members to be designated by the President, shall count all nominating ballots received by the Secretary not later than thirty days before the date of the annual meeting.

The **three** members who shall have received the greatest number of nominating ballots for the office of President, **the three members who shall have received the greatest number for Vice President**, the three members receiving the greatest number for Treasurer and the six members who shall have received the greatest number for Trustees shall thereby be placed in nomination. If there be a tie vote among the number required to be placed in nomination an additional number of names to cover such ties shall be placed in nomination.

Tickets shall be printed on which the names of nominees shall be placed in the order of preference, the name of the person receiving the greatest number of nominating ballots for each

office to be placed at the top of the list of nominees for that office.

Section 4. The election shall be by letter ballot. At least twenty-one days before the date of the annual meeting, a ticket shall be mailed to each member of the Association entitled to vote. Each member shall be entitled to vote for one candidate for President, **one candidate for Vice President**, one candidate for Treasurer and two candidates for Trustees.

The next three paragraphs were unchanged.

The member who shall have received the plurality of the votes cast for the office of President shall be declared elected. The member receiving the highest number of votes for **Vice President** shall be declared Vice President. The member who shall have received the highest number of votes for Treasurer shall be declared elected. Subject to the provision that no two Trustees shall be residents of the same State, the two members who shall have received the greatest number of votes for Trustees shall be declared elected.

The next two paragraphs were unchanged.

"Section 8. The President, **Vice President** and Trustees shall be ineligible to election for a consecutive term."

"Article IV, Section 2. A **majority** affirmative vote of the Membership Committee shall elect to Active, Corporate, or Associate Membership, **subject to review by the Executive Committee.**"

The morning meeting of Tuesday began at 9.30 with the report of the Executive Committee and the adoption of the amendments just referred to. The Secretary's report was brief, the principal statement being that more than 100 members had been added during the past year. In view of the public funeral of the naval heroes of Vera Cruz the President was directed to appoint three delegates to the funeral, and J. C. Trautwine, Jr., to draft appropriate resolutions in behalf of the society.

The special committee on permanent headquarters presented a majority report, and a minority report by Charles B. Burdick. The former recommended that permanent headquarters be established, estimating that this would add about \$2,000 a year to the expenses of the society, and that the dues be increased to \$8 a year to cover this cost. The Executive Committee held the view of the minority report that the increase in cost would not be justified by net benefit to the society, and the minority report was unanimously adopted.

Reports of other special committees were then presented as follows: The National Bureau or Department of Health, read by the chairman, Theodore A. Leisen, recommended dissolution of the committee and appointment of one of three members on Prevention of Pollution of Streams.

On Tabulation of Rates and Other Information, read by the chairman, F. C. Jordan. This report was very voluminous, including the tabulation of

complete information concerning about 600 water works plants, and discussion of several questions as to policy of management, and was briefly described. The convention directed that this be printed as a separate pamphlet as soon as possible and distributed to members.

At this point—10.40 a. m.—Mayor Blankenburg delivered an address of welcome, which was responded to briefly by President Thomas, who then read the President's annual address. In this he referred to the change in the publication of the society's journal to a quarterly and to the formation of the New York local section. He advocated more general standardizing in the water works field and expressed the hope that within a short time the New England and the American Water Works Associations would agree on common standards for cast iron pipe and for fire hydrants, the latter of which had already been substantially reached. Standard specifications for meters he considered especially desirable. He thought there was too much entertainment at the convention, at the expense of the pocket-books of the associate members and the time of the convention. He called attention to the fact that the income for the year exceeded the expenses by only \$8, and made a plea for care of the society's finances.

The result of the election of officers for the ensuing year was announced to have made George G. Earl, president; Nicholas S. Hill, vice president; James M. Caird, treasurer, and Allen Hazen and A. W. Cuddeback as trustees.

The Treasurer reported disbursements of \$6,130.30 and a cash balance of \$1,064.24, which was certified to by the Auditing Committee, which stated that there were no unpaid obligations. The committee recommended that insurance be taken out on the volumes of past proceedings which were on hand, and on the office equipment.

Edward S. Cole presented the report of the Committee on Water Consumption, accompanied by a tabulation of data on consumption from 150 cities, asking permission to revise and complete the data before publication.

Dabney H. Maury, chairman of the Committee on Electrolysis, had nothing new to recommend except the dissolution of the committee; but on motion of Mr. Alvord the committee was asked to continue and watch events.

The Committee on Standard Specifications for Hydrants and Valves reported that it had nearly reached an agreement with the New England Water Works Association on a uniform standard, and asked to be continued.

In the afternoon the papers on the program were read and discussed, except that the first was read by title only. These will be given in a later issue.

The Committee on Standard Specifications for Cast Iron Pipe and Specials reported progress and was continued. The meeting adjourned at 4.30. (Continued on page 722.)

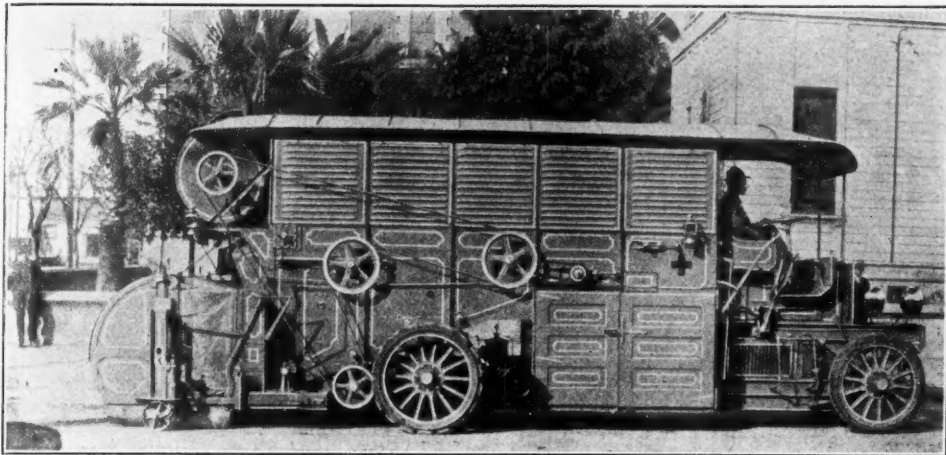
NEW APPLIANCES

SUCTION STREET SWEEPER.

Claim No Dust Raised and Cleans Thoroughly.

According to letters written by city officials of a prominent western city,

run the machine, two men—an engineer and a laborer—are required. The sweeper runs two and one-half miles per gallon of gasoline consumed, and 150 miles per gallon of lubricating oil. The consumption of broom fiber, the



SUCTION TYPE OF STREET SWEEPER.

the suction type of street sweeper, which has been in use there for the past six years, has shown satisfactory results, in that dust and solids are thoroughly cleaned from streets without causing any nuisance.

In the issue of May 19, 1909, Municipal Journal described this machine as "quite complicated . . . its chief elements being an ordinary rotary broom sweeper, enclosed in a dust case, which throws the dirt into a sheet iron flue, through which two rotary fans suck up the dust and blow it into the interior of the wagon, where it settles into cans, which are removed when full. The various parts of the machine are operated from a motor by means of a rope drive."

The manufacturers announce that since the publication of this description changes have been made from time to time in order to perfect the sweeper. Among these is the change from a horse-driven to a motor-propelled machine, thus giving greater speed and efficiency in sweeping.

The city officials referred to state that the sweeper cleans asphalt, brick, bitumen, bitulithic and block pavements thoroughly, and without raising a dust. This was well illustrated in a test made last year, when streets which had already been swept by the ordinary rotary broom were immediately afterward re-swept by the suction sweeper, and 409 pounds of additional dirt were removed from an area of 6,080 square yards.

The machine is said to sweep a space eight feet wide at a speed varying from two and one-half miles to eight miles an hour depending upon the amount of dirt on the roadway. To

manufacturers claim, amounts to one-third pound per mile swept on good street pavements.



CEMENTLESS PATCHES.

The accompanying illustration shows the sanitary street sweeper as it looks today.

NEW GARBAGE CAR.

Where garbage disposal plants are located some distance from the city proper, it becomes necessary to convey the garbage in a receptacle which is watertight to avoid leakage of the material and consequent nuisance on account of odor.

A new garbage car has recently been placed on the market which is said to be non-leakable and to discharge its contents easily. The car, here illustrated, consists of a large tank with semi-circular bottom and capacity of 12,000 to 18,000 cu. feet. The tank rests on rockers at the ends and at intermediate points on rollers so that it can be dumped and righted with the expenditure of very little power.

These cars are built to conform to standard M. C. B. requirements in every respect for transit on their own wheels by any railroad.

Large quantities of these cars have been supplied to Cleveland, Columbus, Toledo, St. Louis and a number of other cities.

Cementless Tube Patches.

An improvement which will save motorists a great deal of time, annoyance and money, has been made by the Firestone Tire and Rubber Company of Akron, O., in its cementless tube patches.

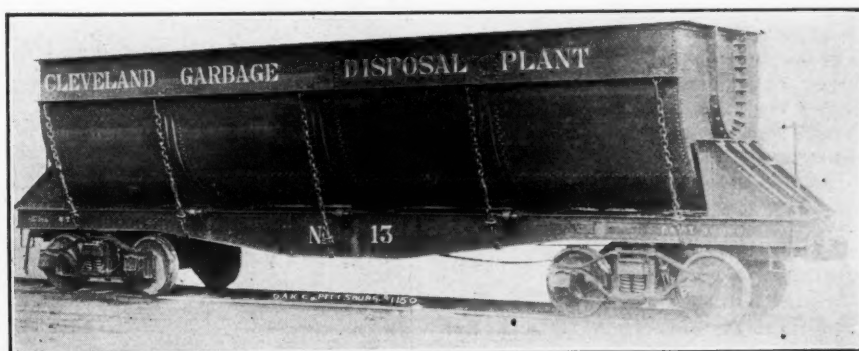
Formerly many patches were ruined in the effort to remove the glazed muslin with which the patches are lined. There was no way by which it might be gripped and taken off.

Now, however, a thumb tab, part of the lining, extends beyond the circumference of the rubber. With one operation the muslin can be removed and the patch is ready for use.

THE NEW K. & E. STADIA CIRCLE.

Not Necessary to Read Vertical Angle—Stadia Tables, Charts and Slide Rules Not Required.

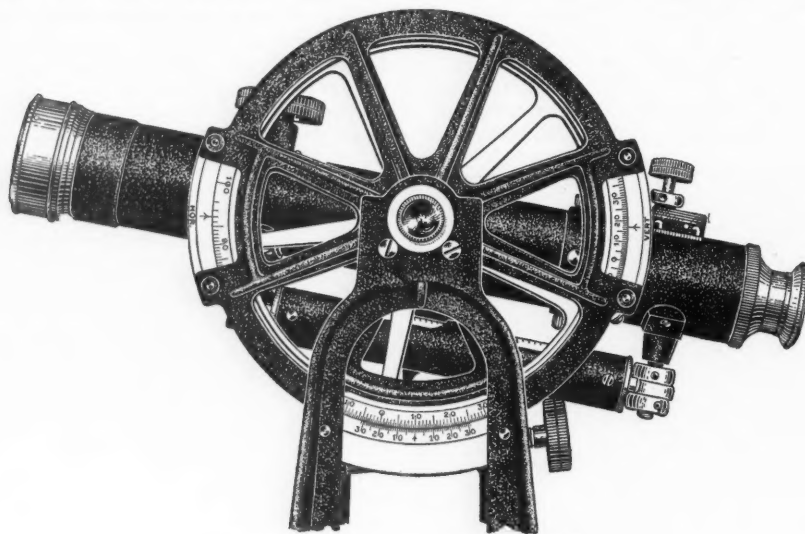
The subsequent computations necessary to reduce observed stadia distances to the correct horizontal and vertical distances have long been a



GARBAGE CAR USED IN CLEVELAND.

source of trouble and labor in surveying. Many arrangements such as charts, tables and slide rules have been devised to minimize this work, but all have been somewhat complicated and have presented a fruitful source of error. For this reason stadia measure-

read the percentage factor to be applied to the observed stadia distance to obtain the correct horizontal distance. At the index marked Vert. is read the percentage factor to be applied to the observed stadia distance to obtain the difference in elevation



THE K. & E. STADIA CIRCLE.

ments have not found the universal application which their accuracy and convenience would presuppose.

In the new K. & E. Stadia Circle an arrangement is presented which the manufacturers, Keuffel and Esser Co., say will stimulate the use of stadia measurements in all branches of surveying. Not only does this arrangement facilitate the taking of field notes, but it reduces the calculations of these notes to the simplest arithmetical processes and, furthermore, the arrangement does not encumber the instrument with complicated and delicate equipment.

The usual method of taking stadia measurements is to observe the interval intercepted on a rod by the stadia hairs and the angle of depression or elevation of the telescope. With this data the observer is then enabled, by using the formulas $H = S \cos^2 a$ and

$$V = \frac{S}{2} \sin 2a, \text{ to compute the correct}$$

horizontal distance and elevation of the point in question. The mechanical means devised for the solution of these formulas have greatly simplified the plotting of notes, but their use still involves considerable labor and necessitates the carrying of extra equipment into the field.

The K. & E. Stadia Circle is a modification of the regular transit circle whereby the degree graduations on two opposite segments are replaced by special graduations which give directly the per cent of the observed stadia distance represented by the horizontal and vertical components. The accompanying illustration shows the simplicity of the new arrangement.

Through an arc of approximately 60° at the right and left hand sides of the circle the degree graduations are replaced by the special stadia graduations. At the index marked Hor. is

between the rod and instrument. Complication in the calculations is avoided by bringing the center cross hair of the telescope to a target or mark on the rod which has been placed at the instrument height before reading H and V.

The greatest advantage of the device is said to be in the rapidity with which field notes and the subsequent calculations can be made.

NEW ASPHALT PLANT.

Used in Road Work at the Ashokan Reservoir.

In the construction of an asphaltic macadam roadway, about 32 miles in length, at the new Ashokan Reservoir of New York City, the contractor—The Continental Public Works Co., of New York, N. Y.—is using an asphalt mixing plant of a type recently brought

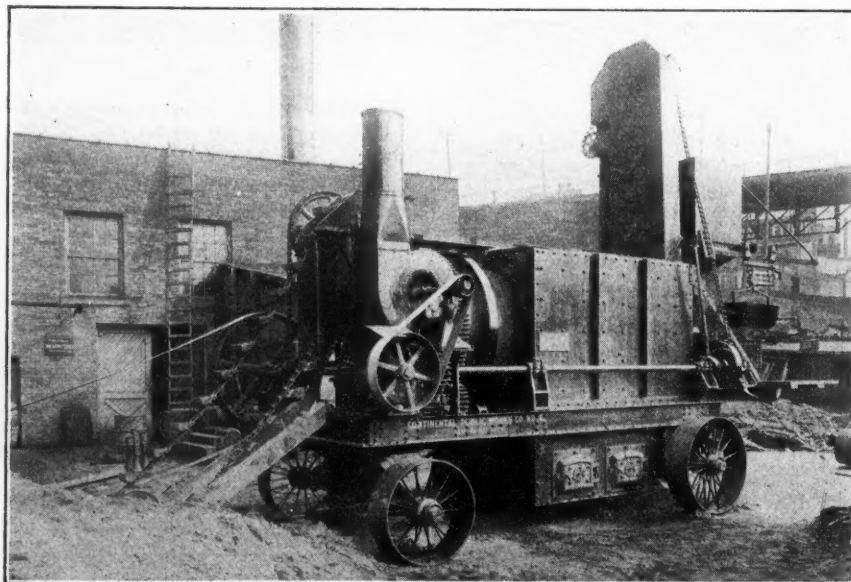
out. The accompanying illustration shows the mixing unit of the plant, which is made in two sizes, one having a capacity of 750 sq. yds. of 2-in. topping per day and the other of 1,000 sq. yds. of 2-in. topping or an equivalent of asphalt macadam or concrete.

The plant was purchased after a test conducted at the factory in Cleveland. This test was run for one hour and was conducted using sand and water, which, it is stated, subjected the machine to a test practically equivalent to actual working conditions with the usual paving materials. The sand contained 7 per cent of moisture, and an average temperature of 412 degrees F. was obtained at the foot of the drier. During the 1-hour test, 10½ sq. tons of mixture were made, which is equivalent to about 1,000 sq. yds. of 2-in. paving mixture per 10-hour day.

In the following description of the machine the dimensions and capacities given are for the 1,000 yd. plant.

The plant consists of three units—the first including the mixing and measuring devices, the second the power plant and the third the asphalt melting kettle. The second unit consists of a 30 H. P. locomotive type, portable boiler and a 25 H. P. horizontal engine, mounted together on an all-steel truck. The third unit consists of a portable melting kettle, having a capacity of 10 tons, mounted on an all-steel truck, or two similar kettles of 5 tons capacity each.

The first unit illustrated herewith consists of a sand drum, mixer, sand bin, measuring box and asphalt bucket, with conveying and weighing mechanism mounted on a steel truck. The sand drum is of the latest Cummer type, having a capacity of 8 tons of sand per hour. The gearing is of cast steel throughout, and the main bearings are brass bushed and adjustable. The sand bin has a capacity of 5½ tons, and is equipped with a rotary screen, arranged to permit the mixing of sheet asphalt topping, binder or asphaltic concrete without change. The sand measuring box is on a beam scale and is so arranged that each ingredient can



CUMMER ASPHALT PAVING PLANT.

be weighed separately or combined. If desired a 5 cu. ft. automatic measuring box can be supplied in place of this. The asphalt bucket is on a double-beam scale, as shown. The mixer is of the batch type with two mixing shafts, and has a capacity of 5 cu. ft.

The trucks are of steel; the front wheels 30 ins. in diameter and 12 ins.

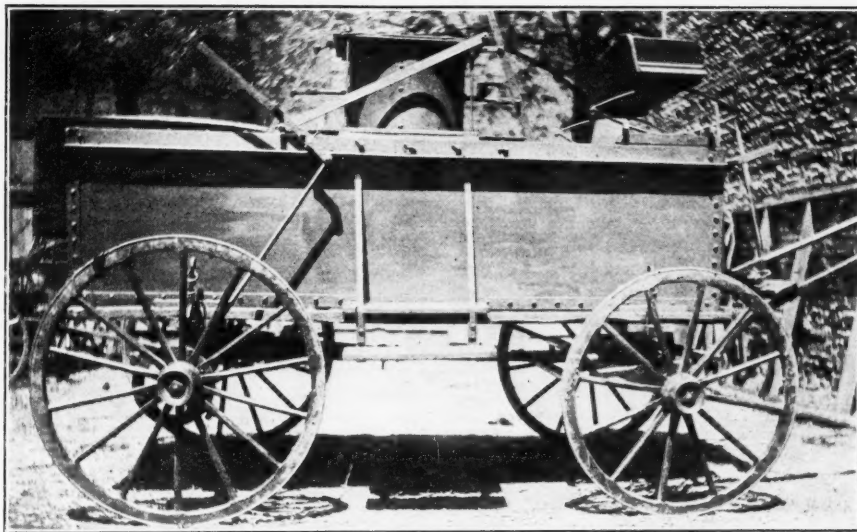
the other at the bottom, which operate in opposite directions by means of a lever. When the top cover is opened the bottom cover closes automatically, and vice versa.

Inside, in the opposite longitudinal upright portions of the cover (the angle flange of which fits over the body), are mounted a series of rocking shafts,

bar, by which the paddles are moved back and forth, distributing the garbage evenly.

Arrangements are provided which are said to prevent vibratory noises when the vehicle is in motion.

The manufacturers state that many sanitary authorities have inspected and approved this new method of handling garbage, but as yet no attempt has been made to introduce the method in any city other than Washington, where the mechanism was worked out.



SANITARY GARBAGE WAGON.

wide, and the rear wheels 36 ins. in diameter and 12 ins. wide. The plant is driven by a belt from the engine, transmission on the plant being by a main shaft 2 15-16 ins. in diameter.

The drug and mixer are connected directly with the main shaft.

The plant can be loaded on a flat car, the top of the bin containing the screen being removed and the upper 4 ft. of the elevator, which is hinged, being laid over on its side. When ready for operation the plant is 21 ft. over all and 10 ft. wide. It requires 20 H. P. to operate it.

The plant is manufactured by the F. D. Cummer & Son Co., of Cleveland Ohio.

SANITARY GARBAGE WAGON.

Garbage Well Shut Off From Air— Patented Paddles to Spread Garbage.

One of the aims of an efficient garbage wagon should be the elimination of all odors in carting garbage through city streets. This is effected to a large degree by a new garbage wagon being perfected in Washington, which is so mechanically arranged as to nearly eliminate the contact of the garbage with the air.

As shown in the illustration, the wagon goes a great way toward preventing the dissemination of noxious odors by providing an almost hermetically sealed body, made of sheet steel, braced and trussed on the sides. Lugs are provided at either end to permit lifting the bed from the running gear. The top is made in three sections, one of these having a circular or rectangular aperture at the bottom of the superimposed receiving dome. This dome carries two covers, one on top,

to which are fixed concave-convex paddles for spreading the garbage. A longitudinal bar is attached to these shafts, which is moved back and forth by means of a transverse rod projecting outside the body, to which rod is pivotally attached a second rod (shown on the side of the wagon in the illustration), and this rod carries a strap that rides on the circumference of an eccentric on the rear driving axle of the truck. When this axle rotates it actuates the outside rod, and the motion is passed on to the transverse rod, which in turn operates the longitudinal

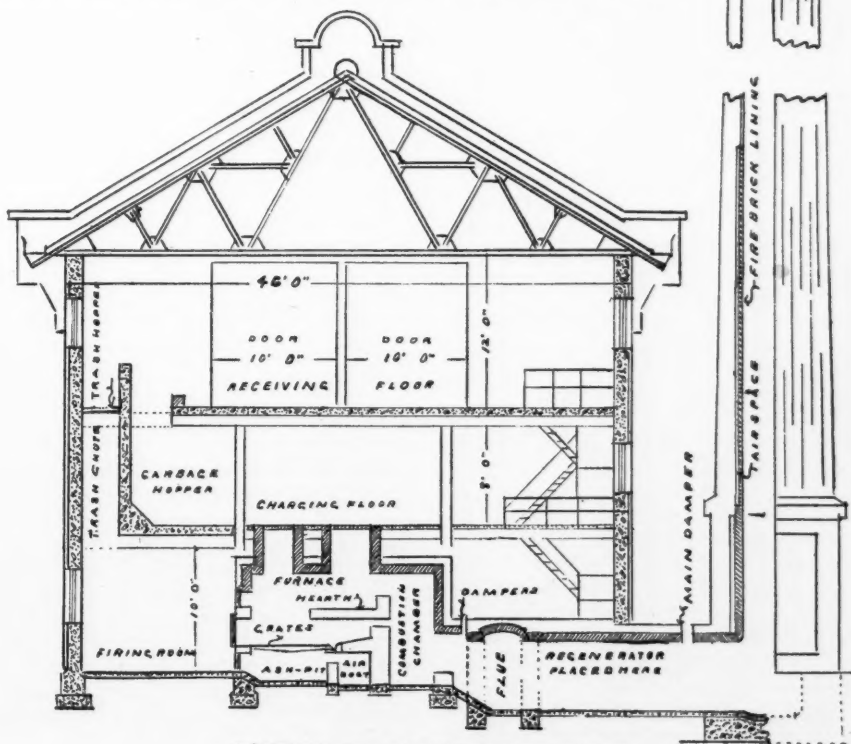
WYLIE-HOOPER GARBAGE AND REFUSE DESTRUCTOR.

Special Designs for Wet Garbage, Manure and for Small Cities.

Patents have been obtained by P. Wylie and J. H. Hooper, of Vancouver, B. C., who have had years of experience in designing, constructing and operating refuse destructors, for certain details which are embodied in destructors designed by them. These are of the high temperature, forced draught type, and can be adapted to either combined or separate systems of collection.

The inventors do not confine themselves to one standard pattern, but claim that conditions in each city should be studied and the details of the plant designed to meet those conditions. In general, they believe that the use of steam from destructors can be made revenue-producing in very few cases, although one of their types of furnaces provides boilers for this purpose.

The general features of their plant



SECTION OF INCINERATOR MODEL.

designed for about 30 tons of municipal garbage is shown in the accompanying illustration, and consists essentially of a drying hearth over the burning grate, the burning gases being carried by forced draft over and to a slight extent under this drying hearth, thence by underground flues to and through a regenerator, and so up the chimney. The furnace is divided into two separate units, as this facilitates regulating the burning when deliveries are irregular, and repairing one part of the plant or drawing the fire there for any other purpose while the other half is being operated. A dust-settling pit is provided behind the furnace.

The regenerator differs from those in common use, in that air, and not the burning gases, is passed through the tubes. Where gas is passed through the tubes, these are apt to clog up, one of the results of which is the creation of smoke. This, of course, is not the case where the gases are carried around rather than through the tubes. In this regenerator the tubes are not built into the brickwork, but any part of the regenerator can be removed in a few minutes.

The garbage is dumped onto a charging floor and is there sorted by the man feeding the furnace, the wet material being placed on the drying hearth, while any refuse which does not require drying out is placed directly on the burning grates. This attendant pulls dry material from the drying hearth onto the grates below, where the final incineration is completed.

In plants of more than one unit, each unit discharges into a cross flue common to all, a damper being provided between each combustion chamber and this cross flue; thus any unit may be cut out without in any way interfering with the working of the others and the plant can burn continuously and need never be out of commission. The air for combustion is drawn by a fan from above the hoppers, and is delivered by the fan through the regenerator and under the burning grates. An air shut-off, within easy reach of the stokers, permits regulating the draught from each furnace as desired.

They have designed a similar plant with a capacity of about 15 tons a day to meet the requirements of smaller towns. This plant also is provided with forced draught, using preheated air, and is claimed to be able to destroy all kinds of town refuse and be constructed at a comparatively low figure which brings it within the purchasing power of smaller communities.

A hospital furnace also is furnished by them, in which the burning grate and drying hearth are both set lower, so that it is possible to throw the material onto the drying hearth from the clearing room floor. A manure destructor has a larger drying hearth than any of the others, and this is perforated to allow the ash to fall from the underside of the burning mass and also to allow the heat to come into direct contact with this underside.

Under different requirements and conditions details of the plant may of

course be modified. Containers may be provided which receive the refuse as delivered and from which it can be fed through the roof of the furnace without rehandling. The dumping floor may be entirely enclosed in the building or may be outside. According to topography, the dumping floor might be at the ground level and the garbage lifted to a charging floor, or it may be above the charging floor, or on a level with it.

Furnaces of large capacity are charged through the roof, but smaller ones are charged through either the front or side by hand, as this reduces the cost of building and of operation and permits maintaining a more even temperature.

Where the elevation will permit, a clinker cooling chamber may be constructed below the furnace level, into which hot clinkers are dropped through a trap door. The fan intake for the forced draft would be connected with this chamber and draw back to the furnace all smoke and odors arising from the clinkers.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago Quotations—4 inch, \$26; 6 to 12 inch, \$24; 16 inch and up, \$23.50. Birmingham Quotations—4 inch, \$21.50; 6 inch and upward, \$19.50. New York—Demand about normal for the season. Quotations—6 inch carloads, \$22 to \$23.

Lead.—Quotations, New York—\$2.90; St. Louis, \$3.80.

Water Tank.—The Chicago Bridge & Iron Works have been awarded the contract for furnishing the water works system of Sheffield, Iowa, with a 40,000-gallon tank, 100 feet to bottom.

Dump Wagons.—The Studebaker Company of South Bend, Ind., has been awarded the contract of furnishing the city of Flint, Mich., with six dump wagons, each to cost \$100.94.

Portable Asphalt Paving Plant.—The F. D. Cummer & Son Company of Cleveland, Ohio, has just secured an order from the City of Atlanta, Ga., for a Cummer one-car portable asphalt paving plant with a guaranteed capacity of 2,000 yards of 2 inch top per day, or the equivalent of Topeka Specifications or Asphalt Macadam. Atlanta has considerable asphaltic concrete to lay, and the above plant will no doubt be kept busy the greater part of the summer.

Export Office Opened.—The American Gas Machine Company of Albert Lea, Minn., has opened an export office in New York owing to the fact that their export trade has assumed such large proportions. This is due mostly to the efforts Charles E. May, formerly publicity manager of the company, who has been placed in charge of the New York office. Eastern business will henceforth be handled in New York, the Binghamton office

having been discontinued. The advertising department of the company is now headed by James I. Haynes, of Moline, Ill., who has had extensive experience in publicity.

Steam Shovel.—The Thew Automatic Shovel Company of Lorain, Ohio, has been awarded the contract for furnishing the city of Flint, Mich., a steam shovel to cost \$3,985. An expert will be on the grounds to demonstrate the machine.

Amiesite.—The Amies Road Company, Drake Building, Easton, Pa., publishes an interesting booklet describing Amiesite, the theories upon which its manufacture is based and the reasons why its inventor, Dr. Joseph Hay Amies, believes it is superior to bituminous material mixed by the hot process. Amiesite is a bituminous concrete manufactured at central stationary plants. The aggregate is preferably crushed trap rock. Bituminous or carbonaceous binders chemically treated and water dampened sand are the other materials. In the manufacturing process, broken stone cold is placed in a mixer. Then an asphaltic oil lighter than water is added. Next a heavy bituminous binder, moderately heated, is added. Then a certain amount of chemical ingredient is added. Next the water dampened sand is put in the mixer to render the product granular and friable. In this condition it may be stored or shipped. The purpose of the chemical treatment mentioned above is to replace water contained in minute cells of the stone with lime silicate, thus closing them up. It is claimed that the water in the cells, left there in the ordinary hot process, is the cause of the stripping off of the bituminous coating and a cause of pavement disintegration.

News of the Societies.

(Continued from page 718.)

Engineers' Society of Delaware.

George S. Bliss, director of the Pennsylvania Climatological Service, addressed the Engineers' Society of Delaware last week on "The Importance of Meteorological Data in Engineering." The address was illustrated by colored lantern slides. The first illustrated slide was of a sketch of the direction of air currents. Among the others were origin and paths of storms across North America and making predictions from their daily charts. A large number of the slides showed descriptions of tornadoes, lightning and snowflakes.

American Society of Engineers, Architects and Contractors.

At the first regular monthly meeting of the society, held on May 12th in the United Engineering Building in New York, Mr. C. W. Green, Consulting Engineer, Public Service Commission, gave an illustrated address on subsurface structures in New York City.

ADVANCE CONTRACT NEWS

ADVANCED INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS				
Ind.	Sullivan	May 16	Constructing three roads, crushed stone and gravel.....	W. L. Sisson, Co. Surv.
Minn.	North Branch	11 a.m., May 16	Clearing, grubbing, turnpiking, 47,000 lin. ft.; also concrete and corrugated culverts.....	A. F. L. Strongren, Auditor.
Tex.	San Antonio	May 16	78 miles gravel road; 2,700 cu. yds. concrete culvert.....	V. H. Howard, Auditor.
O.	Marion	noon, May 16	Grading, rolling and macadamizing.....	Road Comrs.
Cal.	Richmond	May 16	Constructing last unit of tunnel and harbor highway, cost about \$100,000.....	City Council.
Ala.	Moulton	11 a.m., May 16	Macadamizing road; cost, \$6,542.....	W. S. Keller, State Hwy. Eng., Montgomery.
O.	Fostoria	1.30 p.m., May 16	Piking and repairing about 2 miles.....	J. E. Hershberg, Co. Aud.
O.	Elmore	Noon, May 18	6,930 sq. yds. block pavement on concrete foundation....	Village Clerk.
Minn.	Winona	8.30 p.m., May 18	Cement sidewalks.....	G. W. Hoffman, City Rec.
La.	Bossier City	May 18	Constructing gravel road, 6 miles.....	State Hy. Comrs., N. Orleans.
O.	Piqua	m., May 18	Paving with various materials, curbing, bridges, and culverts, etc.....	A. Schroeder, Dir. Pub. Serv.
N. D.	Bismarck	8 p.m., May 18	Grading boulevard.....	R. H. Thistlethwaite, City Aud.
R. I.	Providence	2.15 p.m., May 18	Constructing wood block pavement.....	J. H. Gainer, Mayor & Chr.
Mich.	Lansing	5 p.m., May 18	Sidewalks and crosswalks for ensuing year.....	E. A. Faunce, City Clk.
N. J.	New Brunswick	May 18	Paving about 62 streets.....	City Clerk.
Minn.	Waseca	2 p.m., May 18	Oil tractors and graders.....	T. Peterson, Auditor.
Mont.	Helena	noon, May 18	Cement walks.....	R. N. Hawkins, Sec. State Bd Examiners.
O.	Lisbon	1 p.m., May 18	Constructing 2½ miles of road.....	J. C. Billingsley, Pres.
Tenn.	Memphis	May 19	Paving one street, cost \$45,000.....	J. R. Weatherford, C. E.
Wash.	Rosalie	May 19	Improving about 8.7 miles.....	State Hwy. Bd., Olympia.
O.	Youngstown	noon, May 19	Paving three streets.....	H. C. Fox, Clerk.
N. Y.	Niagara Falls	7.30 p.m., May 19	Furnishing materials and constructing pavements and sidewalks.....	Bd. Public Wks.
Ill.	Chicago	11 a.m., May 20	Street improvement, various materials for paving.....	Bd. Local Improvements.
Tex.	Belton	May 20	Constructing gravel road.....	Co. Comrs.
Kan.	Topeka	May 20	Cement sidewalk; annual contract.....	A. R. Young, City Engr.
Ind.	Logansport	about May 20	21 blocks sheet asphalt, and 9,000 sq. yds. various materials.....	H. H. Thompson, City Engr.
N. Y.	Brooklyn	11 a.m., May 20	Regulating and paving with preliminary and permanent asphalt.....	L. H. Pounds, Boro. Pres.
Ill.	Chicago	11 a.m., May 20	Constructing cement sidewalks.....	Board Local Imp.
Tex.	Temple	May 20	Road construction.....	City Clerk.
Pa.	Franklin	7 p.m., May 20	13,000 sq. yds. brick on concrete.....	J. G. Crawford, Clerk.
Tenn.	Bluff City	May 21	25 miles of graded and macadam roads.....	Chr. Pike Roads Comm.
N. J.	Passaic	10.30 a.m., May 21	Laying sheet asphalt pavement.....	W. A. Reid, Dir. Dept. Sts.
N. Y.	Schenectady	1 p.m., May 21	Improving several roads.....	J. N. Carlisle, Comr., Albany.
Pa.	Williamsburg	8 p.m., May 21	Paving and concrete or vit. brick, 15,000 sq. yds.; 7,600 ft. curb.....	J. B. Stroup, St. Comr.
Va.	Roanoke	Noon, May 21	Granolithic street crossings.....	F. L. Gibboney, City Engr.
Minn.	Benton	1 p.m., May 22	Road work and concrete culverts.....	D. P. Carney, Auditor.
Minn.	Fairmount	1 p.m., May 22	Five miles state road work.....	H. C. Nolte, Auditor.
Ill.	Woodstock	1 p.m., May 22	45,000 sq. yds. concrete pavement.....	G. Lammers, Sec. B. L. I.
W. Va.	Sistersville	6 p.m., May 22	Furnishing material for paving 7,500 sq. yds brick and 5,350 ft. concrete curbing (see proposal ad).....	A. T. Holmes, City Clerk.
Minn.	Fairmont	1 p.m., May 22	Grading and constructing culverts, 5 miles.....	H. C. Nolte, Co. Aud.
N. Y.	Watertown	8 p.m., May 22	Constructing vit. block pavement, curbs, catch basins, etc.....	Board of Public Works.
Minn.	Elbow Lake	10 a.m., May 22	Three road construction jobs.....	O. E. Wolde, County Aud.
N. J.	Milburn	May 25	Constructing road.....	City Clerk.
Ohio	New Lexington	m., May 25	Improving one street.....	T. B. Skinner, Clerk.
Pa.	North East	8 p.m., May 25	5,600 sq. yds. concrete and brick pavements, 3,600 ft. cement curb and gutter (see proposal ad).....	J. M. Leet, Boro. Sec.
Ind.	Vincennes	3 p.m., May 25	3,700 sq. yds. paving.....	E. G. Meyer, City Clk.
Minn.	Crookston	2 p.m., May 26	10,000 ft. road work requiring 15,555 cu. yds. material.....	S. J. Welter, Auditor.
O.	Celina	10 a.m., May 28	Ditching, grading, gravelling or macadamizing (10 jobs).....	D. R. Smalley, Engr.
O.	Delaware	10 a.m., May 28	Grading, draining, macadamizing, about 2.86 miles.....	F. C. Higley, Co. Surveyor.
O.	Canton	May 29	Constructing about 8 miles of road.....	Co. Comrs.
Ohio	Cincinnati	m., May 29	Improving two roads.....	Board of County Comrs.
La.	Alexandria	7.30 p.m., June 1	Bitulithic and fibre vit. brick pavements.....	L. Weil, Sec.
Ark.	Jonesboro	June 1	About 10,000 sq. yds. brick pavement; 4,000 ft. conc. curb.....	Board of Comrs.
O.	Canal Dover	about June 1	Constructing brick pavement.....	W. E. Sykes, Dir. P. S.
Ark.	Jonesboro	2 p.m., June 1	About 10,000 sq. yds. brick paving and 4,000 ft. concrete curbing.....	P. H. Berger, Sec. St. Imp. Com.
O.	Bowling Green	1 p.m., June 2	Grading, draining, macadamizing and applying tar binder.....	C. E. Stinebaugh, Co. Aud.
Ind.	Logansport	10 a.m., June 4	Constructing road.....	C. E. Medland, County Aud.
Ill.	Elgin	June 15	Paving with asphaltic concrete, 30,000 sq. yds.....	H. Brightman, Engr.

SEWERAGE

La.	Alexandria	7.30 p.m., May 18	Furnishing 5 miles of vit. clay sewer pipe.....	W. W. Whittington, Jr., Mayor
N. J.	Camden	8 p.m., May 18	Constructing sewers on several streets.....	J. C. Haines, Chm. Com. Sts. and Hwys.
Mo.	Dexter	8 p.m., May 18	Sewerage system.....	W. Watkins, Mayor.
N. Y.	Albany	3 p.m., May 18	Constructing sewage disposal plant and intercepting sewer.....	I. Wachsman, Sec. of Board.
La.	Kinder	May 18	Drainage ditches and canal.....	L. M. LaFleur, Sec. Drain. Dis.
O.	Elmore	Noon, May 18	1,550 ft. combined sewer.....	J. C. Overmyer, Eng., Fremont.
N. Y.	Niagara Falls	7.30 p.m., May 19	Constructing sewer and appurtenances.....	T. H. Hogan, City Clk.
N. Y.	Greece	4 p.m., May 19	Constructing sewer.....	Sewer Comrs., Rochester.
N. Y.	Brooklyn	11 a.m., May 20	Constructing pipe sewer.....	L. H. Pounds, Boro. Pres.
N. J.	Trenton	2.30 p.m., May 20	Constructing drain.....	F. Thompson, City Clk.
Md.	Baltimore	May 20	Lateral sewers and house connections.....	Sewerage Comsn.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Iowa	Greene	7.30 p.m., May 20	Sewers, disposal plant and outlet sewers	Leroy Niles, Town Clerk.
O.	Struthers	May 20	Storm and sanitary sewer	Village Clerk.
N. J.	Elizabeth	May 20	Sewers in several streets	W. P. Neasey, St. Comr.
Mont.	Butte	5 p.m., May 20	400 ft. reinforced concrete storm sewer	W. A. Willis, City Clk.
Minn.	Fairmont	1 p.m., May 20	Constructing tile ditch	H. C. Nolte, Auditor.
N. Y.	Binghamton	4 p.m., May 20	Constructing vitrified pipe sewer	F. M. Hopkins, City Clk.
O.	Cleveland	Noon, May 21	Constructing sewers	A. R. Callow, Comr. P. & Sup.
Ill.	Chicago	May 21	Excavation work, etc., on channel	J. McGillan, Clerk.
O.	New Philadelphia	May 21	Constructing sewage disposal plant (see proposal ad.)	Director Public Service.
N. Y.	Holley	May 22	Constructing 6½ miles pipe sewers and disposal works	Board Village Trustees.
O.	Nelsonville	Noon, May 23	Constructing sewer in one street	R. S. Weitzell, Dir. Pub. Serv.
Pa.	Lebanon	May 25	55,000 ft. vit. pipe sewer	T. R. Crowell, City Engr.
Sask.	Regina	May 25	Storm and domestic sewers	J. McArthur, City Engr.
Ont.	Sault Ste Marie	May 26	Furnishing and laying about 11,800 ft. sewer pipe, with appurtenances	C. J. Pim, City Clerk.
O.	Canton	May 26	Constructing sewage treatment plant	Dir. Pub. Serv.
Mich.	Cadillac	May 28	Constructing sewage disposal plant, 1,000,000 gals. daily capacity; cost, \$27,000	City Clerk.
Ore.	Portland	3 p.m., May 28	Concrete diversion dam, head work, etc.	U. S. Reclam. Serv.
Wis.	Wittenberg	June 1	Sewer and water works, \$30,000	A. Johnson, Vil. Pres.
Cal.	Pasadena	About June 14	Various sewer improvement, cost \$10,000	R. V. Orbison, Dep. City Engr.
Ill.	Elgin	June 15	36,000 ft. 6 to 15-in. sewer	M. H. Brightman, Engr.
La.	New Orleans	June 17	15-ton hand operated crane, and constructing of drainage canal	F. S. Shields, Sec.
Neb.	Norfolk	About June 25	Storm sewer; cost, \$2,000	H. H. Tracy, City Engr.

WATER SUPPLY

Wis.	Watertown	8 p.m., May 18	Laying about 910 ft. 6 and 4-inch standard water pipe and specials	W. F. Voss, Sec. of Board.
Ont.	Carleton	May 18	Pump and intake pipe, also sewage disposal works	Clerk of Comsn.
Alta.	Calgary	May 18	Delivering c-i. piping	City Clerk.
Mo.	Dexter	8 p.m., May 18	Water works system, including well, pumping station, tower, etc.	J. I. Moore, City Clk.
O.	Lancaster	Noon, May 18	3,000 ft. 6-inch and 1,500 ft. 4-inch c-i. pipe and special castings	J. A. Mayer, Dir. Pub. Ser.
Mass.	Holyoke	10 a.m., May 18	About 91.25 tons of c-i. water pipe	Board Water Comrs.
Mo.	St. Louis	Noon, May 19	C-i. coated water pipe, special castings, stop and tapping valves, post fire plugs and laying pipe	E. R. Kinsey, Pres. Bd. Pub. Imp.
N. Y.	Brooklyn	10 a.m., May 19	Furnishing at navy yard lead pipe	Navy Dept., Wash., D. C.
Ia.	Mt. Pleasant	3 p.m., May 19	Reinforced concrete reservoir, 200,000 gal. capacity; also steam fire pump	W. D. Worthington, City Clk.
Mo.	St. Louis	Noon, May 19	Furnishing and installing three wash water pumps, two pressure pumps, two chemical solution pumps with motors, controlling apparatus and all appurtenances; also pipe and special castings	E. R. Kinsey, Pres. Bd. Pub. Imps.
Que.	Montreal	m., May 19	Installing two 12,000,000-gal. steam-driven centrifugal pumping engines	Board of Comrs.
Pa.	Altoona	May 19	Distributing reservoir, with appurtenances	Dir. Parks & Pub. Prop.
N. J.	Perth Amboy	May 20	Furnishing and laying 13,000 ft. 30-inch c-i. pipes	City Engr. Mason.
O.	Granville	May 20	Improvement to water works; steel tank, power house, pumps, etc.	Board Public Affairs.
O.	Cleveland	Noon, May 20	One motor-driven 4-inch cent. pump; one steam turbine-driven 10-inch cent. pump	A. R. Callow, Comr. P. & Sup.
Pa.	Allentown	5 p.m., May 21	Furnishing water for fire service; annual rental per hydrant and optional period	P. J. McNally, Clerk.
Cal.	Los Angeles	May 21	Furnishing 6 horizontal centrifugal pumps, 2 valves and 2 gate-valves	U. S. Reclam. Service.
O.	Granville	m., May 22	Improvements to water system	Board of Pub. Affairs.
Mass.	Boston	May 22	12, 6 and 20-inch water pipe	L. K. Rourke, Comr.
S. D.	Madison	May 23	30 ft. diameter well	C. A. Trimmer, City Engr.
Mass.	Westfield	11 a.m., May 23	Laying 8,230 ft. 6-inch water pipe	J. L. Hyde, Town Engr.
Wash.	Fort Worden	May 29	Furnishing and laying c-i. water main	Constructing Q. M.
N. J.	Woodbury	7.30 p.m., May 31	Installing artesian well, water supply system	A. Starr, City Clerk.
Alta.	Calgary	June 1	Supplying steel piping	City Clerk.
H. T.	Pearl Harbor	10 a.m., June 2	Cast-iron pipe, galv. pipe, fire hydrants, manhole frames and covers, etc.	Navy Dept., Washington, D. C.
O.	Glendale	Noon, June 8	Extending height of standpipe 30 ft.	Trustees of Public Affairs.
Va.	Emporia	June 10	Installing steel tower and tank, 200,000 gals. capacity	R. F. Whitaker, Sup. W. W.
N. Y.	Sidney	about July 1	Constructing water works, cost \$125,000	Village Clerk.

LIGHTING AND POWER

Ind.	Fort Wayne	noon, May 16	Constructing addition to municipal light plant	Board of Public Works.
N. Y.	Jamaica, L. I.	May 18	Installing electric equipment in school building	Town Clerk.
O.	Saville	Noon, May 18	Supplying electric energy to town	D. S. Hall, Vil. Clk.
N. Y.	Niagara Falls	May 19	Lighting contract, optional period	City Clerk.
O.	Cleveland	Noon, May 22	Electric light poles	A. R. Callow, Comr. P. & Sup.
Ia.	Minden	May 25	Installing electric light plant and distribution system	Supt. School Bldgs, New York, N. Y.
Ia.	Greeley	1 p.m., May 28	Electric light system	B. E. Dow, Town Clk.
N. D.	Mayville	noon, May 29	Rewiring school building	T. A. Hillyer, Pres.
Pa.	Williamsport	noon, June 10	Lighting contract, optional period. (See Proposal Ad.)	S. C. Stabler, Supt. Pub. Wks.
Minn.	Minneapolis	June 10	Furnishing and installing special lighting fixtures in post office	Supv. Arch., Wash., D. C.

FIRE EQUIPMENT

N. J.	Bloomfield	8 p.m., May 18	Furnishing motor driven hook and ladder	R. F. Davis, Town Clerk.
Mich.	Crystal Falls	5 p.m., May 18	Auto fire truck with pumping engine	W. J. Gribble, City Clk.
N. J.	Bloomfield	May 18	Motor city service truck	R. E. Davis, Town Clerk.
N. J.	So. Orange	8 p.m., May 19	One motor-propelled city service truck	M. A. Fitzsimons, Vil. Clerk.
Pa.	Williamsport	m., June 1	One triple combination motor pumping engine. (See Proposal ad.)	P. S. Harman, Supt. Pub. Safety.

BRIDGES

Ind.	Greencastle	May 16	Two reinforced concrete bridges	Co. Comr.
Minn.	Ada	May 19	Constructing two bridges	County Board Contract.
O.	Toledo	10 a.m., May 22	Constructing bridge and abutment	County Board Comrs.
O.	Cincinnati	m., May 22	Constructing concrete culvert, bridge and wall	A. Reinhardt, Clerk.
O.	Tiffin	May 23	Three concrete arch bridges	County Comrs.
Ind.	Kokomo	10 a.m., May 23	Four bridges	County Comrs.
Minn.	Crookston	3 p.m., May 25	Constructing reinforced concrete culverts	H. J. Welte, Comr.
Ind.	Indianapolis	May 27	Constructing bridge	Comr.
Pa.	Chester	10 a.m., May 28	Constructing two concrete bridges	O. L. Davis, Co. Controller.
Pa.	Philadelphia	May 28	Constructing inter-county bridge	Dir. Public Works.
Tex.	San Antonio	10 a.m., May 29	Constructing 11 concrete bridges	B. H. Howard, Co. Aud.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES
Mont., Butte.....	10 a.m., May	29..Constructing	concrete or steel bridge.....	Bd. Co. Comrs.
Fla., Jacksonville	10 a.m., June	3..Constructing	three concrete bridges	Co. Comrs.
N. Y., Charlotte	June	4..Constructing	bridge, cost \$75,000.....	Co. Comrs.
MISCELLANEOUS				
Md., Baltimore	2 p.m., May	16..Two fog signal units, consisting of oil engine and air-compressor	Light House Inspector.	
Ill., Chicago	May	20..Furnishing motorcycle	J. F. Neil, Secy.	
Ind., Hartford City.....	2 p.m., May	20..Constructing cement concrete wall.....	County Auditor.	
Ill., Chicago	11 a.m., May	20..Furnishing one French excavating machine.....	L. E. McGann, Comr. Pub. Serv.	
Ind., Fort Wayne.....	3 p.m., May	25..Furnishing one motor truck, power street flusher. (See proposal ad)	Board of Public Works.	
Ind., Ft. Wayne	May	25..Street flushing device; capacity 1,000 gallons.....	Board of Works.	
Conn., Waterbury.....	4.30 p.m., May	29..Constructing municipal building	City Hall Comm.	
N. C., Rocky Mount.....	3 p.m., May	29..Constructing complete post office	Supv. Arch., Wash., D. C.	
N. Y., New York.....	11 a.m., June	2..Constructing 9 concrete, stone and brick superstructures.....	Comr. Water Supply.	
Ky., Jackson.....	3 p.m., June	17..Constructing complete post office. (See Proposal Ad.) ..	O. Wenderoth, Supv. Arch., Wash., D. C.	

STREETS AND ROADS

Anniston, Ala.—Preparations are being made to oil Noble St. from 123th to 26th St.

Napa, Cal.—State Highway Commission has accepted terms laid down by Napa County Board of Supervisors to provide funds for purchase of sufficient highway bonds for construction of state roads in this county. Highway Commission agrees to accept \$65,000 bonus and underwriting of \$125,000 worth of highway bonds, and further agrees to maintain State highway from city of Napa to Solano County line, provided that estimates show that cost of Black Point cut-off can be kept within \$300,000 to be raised.

Oakland, Cal.—Alameda County has disposed of State Highway bonds, recently purchased of State for \$202,133.33. The Angle and London Paris National Bank of San Francisco purchased the bonds, through Central Bank of Oakland. The State will spend entire purchase price of bonds on State highways in this county, and will keep them up without any further expense on part of Alameda County.

Oakland, Cal.—City Council has adopted resolution confirming report of commissioners in regard to widening East 20th street at 16th avenue.

Pomona, Cal.—Resolutions of intention for paving of West Second street and East Holt avenue have been passed by City Council. Resolutions of intention were ordered for paving of other main thoroughfares.

San Bernardino, Cal.—Campaign for \$1,750,000 good roads bonds, resubmission of question defeated in February by narrow margin under two-thirds necessary majority, has been received by County Board of Supervisors, and petition was filed.

Lewes, Del.—Various street improvements have been planned.

Washington, D. C.—A hearing on proposal to widen Georgia avenue from Rock Creek Church road to District line will be held by commissioners in board room of District building on May 13 at 10 a. m.

Macon, Ga.—Complete arrangements for model highway between Macon and Columbus, via Reynolds and Junction City, have been completed by committee that has been working on proposition for several months.

Dixon, Ill.—City of Dixon will spend \$165,689.15 on improvements this year. All but \$2,657.15, which is for sewer, is to be spent upon paving. Lincoln highway, on southeastern outskirts of city, will be paved with concrete.

Bluffton, Ind.—Bonds for various street improvements will be sold by James A. McBride, treasurer of Wells county, on May 15.

East Chicago, Ind.—Information is wanted by the Northern Construction Co., First National Bank building, concerning oil sprinklers.

Evansville, Ind.—County Treasurer Carl Laudenstein has sold \$14,400 worth of gravel-road bonds to City National Bank.

Leavenworth, Kan.—Commissioners have instructed City Clerk Kirmeyer to advertise for bids on several street improvements and work will be rushed as rapidly as possible. Improvements are: Regrading, curbing and paving Oak St., between West Seventh and Broadway; regrading, paving and curbing, of Sixth St., between Chestnut and Olive Sts.; paving the west and east alley between

Fourth and Fifth Sts., and Miami and Osage Sts.; paving the east and west alley between Seventh and Broadway, and Cherokee and Delaware Sts.

Brushy Landing, La.—Steps have been taken to assure parish of about 25 miles of improved highways.

Haverhill, Mass.—Municipal Council is laying plans for expenditure of large sum of money for improving streets and putting in sewers. Council is considering schedule which provides for expenditure of about \$100,000 for macadam work and about \$25,000 for sewer work.

Lawrence, Mass.—Bids on from 20,000 to 100,000 gallons of oil, with 40 per cent. asphalt, have been received by Purchasing Agent McConnor, as follows: Gulf Refining Co., 4½ cents per gallon; Indian Refining Co., 6 cents per gallon; Texas Oil Co., 4.62 cents per gallon; Standard Oil Co., 4.65 cents per gallon; U. S. Asphalt Refining Co., 4.85 cents per gallon. Oil will be delivered in tanks containing 10,000 gallons.

Salem, Mass.—County commissioners, town of Peabody, and State Highway Commission have agreed to reconstruct highway between Salem and Danvers line this summer, street being known officially as Margin street, and also as one of poorest pieces of highway in county of Essex, if not in Massachusetts.

Taunton, Mass.—Order for city loan of \$30,000 for street improvements, of which \$10,000 is to be expended on Middleboro avenue, above East Taunton, favorably reported by committee on streets and bridges, has been passed to second reading.

Ware, Mass.—Appropriation of \$10,000 for state road between Ware and Palmer is being considered.

Santa Fe, N. Mex.—Engineer D. S. Hooker, connected with State Engineer's Department, has completed preliminary examination of proposed road from Carizozo to Alamogordo, distance of 57 miles.

St. Joseph, Mich.—Voters of St. Joseph Township at a special election Saturday sanctioned the issuance of a bond issue for \$14,000 for betterment of its good roads system. Proceeds from sale of bond issue will be used in widening and repairing present stone roads on Lake Shore Drive and Niles roads. Between six and seven miles of highway will be improved. Width of roadways will be increased from 14 to 16 ft.

St. Paul, Minn.—List of bonds which have been sold subject to delivery as funds are needed for various improvements, as follows: Snelling Ave., \$37,570.80; Summit Ave., \$183,350; Robert St., \$100,000; Market St., \$6,200; Case St., \$15,640; University Ave., (1) \$115,890; University Ave., (2) \$264,600; Prior Ave., \$34,910; Hastings Ave., \$25,320; Hamline Ave., \$4,600; Dale St., \$73,000; York and Westminster Sts., \$7,970; total, \$869,050.80.

Forsyth, Mont.—Construction of about 30 blocks of concrete sidewalks has been ordered.

Asbury Park, N. J.—City council has approved of motion to advertise notice of intention of grading, graveling and guttering Fourth Ave., from Bridge St. to Ridge Ave., Jeffrey, Central, Dunlewey, Prospect, and Drummond, from Third Ave. to Deal lake and Third Ave., from Jeffrey St. to Ridge Ave.

New Brunswick, N. J.—Ordinances have been passed for various street improvements. E. J. McMurtry is city clerk.

New Brunswick, N. J.—Road improvements Freeholders have desired to make

have become possible, as result of conference the board held with State Road Supervisor Stevens, who assured Middlesex men that county would receive from \$40,000 to \$50,000 from State automobile fund this year. Among proposed improvements are rebuilding of road from Highland Park to Metuchen, the repairing of Bonhamtown road, the resurfacing of Weston's Mills-South River road, and repairing of South River-Cranbury road and first section of Roosevelt-Carteret road.

Perth Amboy, N. J.—See "Water Supply."

Plainfield, N. J.—Ordinances have been passed on first reading at council meeting authorizing issuing of corporate bonds of town for amount of \$127,000 for paving and sewer work.

Plainfield, N. J.—Ordinance has been passed providing for macadamizing of West End avenue, between Rockview avenue and Green Brook road, and clerk authorized to advertise for bids on this work.

Westfield, N. J.—Four ordinances have been passed upon first reading by Town Council for issuing bonds to amount of \$129,329.24 to take up outstanding improvement certificates. Bonds and amounts are as follows: East Broad St. Rd. bonds, \$17,000; general improvement funding bonds, \$54,329.24; sewer and sewer disposal plant bonds, \$17,000, and sewer, sidewalk and road bonds, \$41,000.

Albany, N. Y.—State Superintendent of Prisons, John B. Riley, has prepared bill appropriating \$50,000 for employment of convicts upon highway construction. He will ask governor to recommend measure in special message to Legislature.

Brooklyn, N. Y.—Petition has been signed with over 2,000 names, asking Borough President Pounds and Board of Estimate to pave New Lots road, from Williams St. to New Jersey Ave.

Brooklyn, N. Y.—Board of Estimate and Apportionment has given final authorization for 10 public improvements in Brooklyn, total estimated cost of which is \$147,100, and 23 preliminary authorizations, estimated cost \$84,000. They gave six final authorizations for Queens, at total estimated cost of \$102,400, and six preliminary authorizations, total estimated cost \$140,000. One of principal undertakings for Queens, regulating and grading Ditmars avenue, from Astoria avenue to Frigate street, 14 blocks, at East Elmhurst, estimated cost of which is \$54,000, was given both preliminary and final authorization at same meeting. Big sewer main to be an outlet for house sewage of 7,500 acres of the westerly half of town of Newtown will go through this avenue to Long Island City. Preliminary authorization was given for paving with improved granite blocks Harris avenue, from Vernon avenue to Crescent street, and from Prospect avenue to Jackson avenue, 11 blocks in length. Harris avenue is an important connecting thoroughfare between the important manufacturing industries along the East River front, and the Queens Borough Bridge Plaza, at its easterly portal. Principal final authorization in Brooklyn is for system of sanitary and storm water sewer mains in the Gravesend section, in Homecrest avenue, from Avenue S to Avenue U, and in 12th, 13th, 14th, 15th, 16th and 17th streets and between Avenues R and T, the estimated cost of which is \$89,000.

New York City, N. Y.—Zaldo & Martinez, 66 Beaver St., N. Y. Cuban export agents, want catalogues and prices of street sprinkling, street sweeping and

flushing machines—horse-drawn and motor-driven.

Plattsburg, N. Y.—Following propositions will be voted on May 19: \$23,400 for improving various streets; \$50,000 for completing reservoir and purchase of additional land and \$2,100 for opening Durand St.

Schenectady, N. Y.—Department of Public Works has been authorized and instructed to take up matter of patching asphalt pavements of city, and bids will be advertised for. They will be opened and contract awarded May 13.

Selma, N. Y.—Citizens of Loundes county will vote on May 11 on \$200,000 bond issue for public roads.

Utica, N. Y.—City bonds aggregating \$153,000 have been purchased by Savings Bank of Utica, as follows: for parkway, \$18,000; for street resurfacing, \$20,000; for subway, \$25,000, and for school, \$90,000.

Watertown, N. Y.—Board of Public Works will be asked to adopt resolution to advertise for bids on brick pavement in Coffeen St., to be laid during summer. Paving job is one of largest to be undertaken in Watertown this year. About 300,000 bricks will be necessary to improve street, from junction of Court and Coffeen Sts. to Cedar St., where state will take up work and continue road some distance.

Greensboro, N. C.—Bond election may be held July 21 for voting on \$100,000 in bonds for street purposes.

Kinston, N. C.—Lenoir County will shortly be called upon to vote on bond issue for good roads.

Raleigh, N. C.—Raleigh city commission has accepted bid of Remick Hodges & Co., New York, for \$100,000 street improvement bonds. Commission pledges to give Raleigh 25 miles of finest streets before another winter.

Roxboro, N. C.—An aggressive campaign is being waged in this county for and against issue of \$150,000 road improvement bonds. Election is to be held May 12.

Columbus, O.—State Highway Commissioner Marker of Ohio will open bids at Columbus, May 10, for paving of 28 miles of old National pike in Belmont county. State department will supervise construction of road and after construction will keep it in repair. Total cost of improvement will be \$600,000, \$150,000 of which will be paid by state, remaining \$450,000 to be paid by Belmont county. Bonds were recently sold by county to raise needed funds.

Columbus, O.—Contracts are to be let in May for rebuilding old National highway east from Columbus, capital of Ohio, to Pennsylvania state line at Wheeling, according to announcement by Highway Commissioner Jas. R. Marker. Distance is 125 miles. It was planned to build road with brick, 16 ft. wide, and with no grade exceeding 7 per cent. On either side of paved surface is to be a 9-ft. shoulder of macadam for turning out. Office of public roads at Washington, however, requested that concrete be used instead of brick, as Federal Government could not participate in improvement if it cost more than \$16,000 a mile. It is probable that brick will be used wherever cost can be kept within this figure.

Lima, O.—Council has referred to committee of whole request of Mayor and Service Director to submit to voters issue of bonds for \$775,000 for public improvements. It was specified that \$400,000 of the bonds are for sewage disposal plant, \$100,000 for sewers, \$100,000 for street improvements, including street signs, \$100,000 for water mains and \$75,000 for street lights.

Youngstown, O.—Resolutions have been passed for paving and grading several streets.

Youngstown, O.—City will sell at 2 p. m., May 18 bonds in sum of \$7,990 for Cherry St. paving, and \$12,655 for Parmelee Ave. paving. D. J. Jones is City Auditor.

Portland, Ore.—City Engineer's representatives Kratz and Fisher have displayed drawings illustrating proposed improvement of Foster road, including removals of car tracks from the 35-foot right-of-way to center of 95-foot street, laying of sidewalks, and hard surfacing street from 52d to 72d streets. Estimated cost is \$7.50 a front foot. Entire cost is estimated at \$81,000. About 30 per cent. of the property owners have signed for this improvement.

Beaver Falls, Pa.—Agreements for construction of three sections of state road in Eastvale borough and North Sewickley township have been received at the office of county commissioners for their approval. Total length of proposed roads is 24,679 feet, and ap-

proximate cost \$125,181.27. Road to be known as State Aid Application No. 122 is 2,295 feet in length, and route is from Fetterman bridge in Eastvale via Fourth street and Second avenue to North Sewickley township line. Approximate cost is given as \$9,994.70. State Aid Application No. 124 begins at ending of other road at borough and township line, and extends through North Sewickley township to New Castle road, distance of 12,186 feet and costing \$65,712.87. Third road begins in Fourth street, at Ellwood City borough line, and extends over Limestone hill on Beaver Falls road to New Castle and Mercer road, distance being 10,198 feet and estimated cost \$49,473.70. As soon as contracts are executed and returned to highway department bids will be taken for work.

Boyerstown, Pa.—City will borrow between \$15,000 and \$20,000 for street paving.

Carrolltown, Pa.—Plans practically have been consummated for paving of Carrolltown's main thoroughfare from one end of town to other, and laying of brick on Carroll street, from Diamond to point short distance beyond municipal building.

Philadelphia, Pa.—Bids have been opened for \$200,000 worth of street paving work. For asphalt resurfacing, bids ranged from \$1.60 to \$1.90 per square yard, as compared with \$2 to \$2.25 under previous bidding. Vitrified brick work bids were \$2.70 to \$2.90, as compared with \$3.22. Teams were offered to the city at \$4.20 to \$5.20 per day, as compared with \$5.40, and sprinklers at \$4.60 to \$5.90, as compared with \$6.

Pottsville, Pa.—Ordinance has been passed for reggrading and paving of West Market St. with paving brick or block. G. A. Berner is city clerk.

York, Pa.—See "Sewerage."

York, Pa.—City Council has passed the \$200,000 loan ordinance which provides for issuing bonds, income from which is to be devoted to street paving, laying of storm water sewers and to put in operation sanitary sewage system, which was laid 12 years ago at cost of \$400,000, but which being incomplete has not yet been used.

Wilkes-Barre, Pa.—Ordinance has been adopted by Plains Township Commissioners providing for paving of five streets with vitrified brick. Streets are Maffet, Stark, Oak, School and Miner. Commissioners instructed secretary to advertise for bids.

Westerly, R. I.—Resolution appropriating \$250,000 for repair and maintenance of state highway system by Board of Public Roads has been presented.

Chattanooga, Tenn.—Road bonds in sum of \$50,000 will be sold on May 18. T. C. Thompson is Mayor.

McEwen, Tenn.—Bond issue has been voted for building concrete sidewalks.

Nashville, Tenn.—General plans for completion of Riverside drive or boulevard, which will extend from eastern terminus of the McGavock street bridge to Shelby park, and through park to Gallatin pike, have been adopted. Stretch of driveway to be built for completion of boulevard will be 40 feet wide and about mile and a quarter long. It will be built of macadam and it is estimated it will cost about \$20,000, exclusive of cost of bridge of equal width to be built over Pugsley's branch, which will probably cost about \$5,000 or \$6,000.

Austin, Tex.—Special 15-cent road tax has been voted on favorably.

Cameron, Texas.—Seventy-five thousand dollars' worth of \$150,000 road bond issue for this district have been sold, deal being negotiated by Mr. R. D. Brown of this city.

Dallas, Tex.—Auditor has been ordered to advertise for bids for reggrading West Dallas and Fort Worth pike, where about 400 yards of it was washed away by rise in Mountain Creek.

Dallas, Tex.—Eleven bids, ranging in price from \$51,666.84 to \$77,175, according to character of material bid upon, have been opened by County Commissioners' Court for paving of Dallas-Oak Cliff viaduct, which, with its approaches, is nearly a mile in length. Bids had been called for on vitrified brick, bitulithic and creosoted wood blocks. The Cullom-Bavousett Company, bidding \$60,931.98, was lowest on wood blocks; the Texas Bitulithic Company, at \$51,725.34, was only bidder upon bitulithic pavement, and Burt-Hahn Construction Company, bidding \$51,666.84, was lowest on vitrified brick. Commissioners' Court

did not reach any decision either as to material to be used or bids. All of bids were referred to County Engineer Witt for tabulation. Bids were received as follows: Creosoted blocks: Burt-Hahn Construction Company, \$77,175.02. Texas Bitulithic Company, guaranteed, \$73,176.83; not guaranteed, \$72,006. Roach-Manigan Company, \$66,517.82. Creosoted Wood Block Company, \$66,462.54. A. J. McKenzie, \$77,166. Cullom-Bavousett Company, \$60,931.98. Texas Bitulithic Company, on bitulithic pavement, \$51,725.34. Burt-Hahn Construction Company, on rock asphalt, \$49,992.59. Burt-Hahn Construction Company, on vitrified brick, \$51,666.84. General Construction Company, vitrified brick, \$55,147.04 unguaranteed; to guarantee, add \$468.04. A. J. McKenzie, vitrified brick, \$52,281.

Fort Stockton, Tex.—Pecos County good roads bonds in sum of \$85,000 have been sold by Commissioners' Court to Ulen & Co., Chicago, consideration being \$85,000 cash.

Houston, Tex.—Hearing for property owners on streets given below will be held May 13, at which time property owners will be given opportunity of stating their preference of paving in accordance with rules of the city. Streets to be paved, character of materials, and aggregate amounts are as follows: Louisiana, from Dallas to Pease—sheet asphalt, \$15,156.50; asphaltic concrete, \$15,181.55; bitulithic, \$16,969.30; wood block, 3-in., \$19,551.60; wood block, 3½-in., \$21,340.20; standard brick, \$17,883.30; V. F. brick, asphalt filler, \$16,745.40; Uvalde rock asphalt, \$15,170.25. Wilson, from Andrews to San Felipe—Portland cement concrete, \$3,714; wood block, 3-in., \$4,943.20; standard brick, \$4,578.40; V. F. brick, asphalt filler, \$4,306.60; sheet asphalt, \$3,980.20; asphaltic concrete, \$3,836.20. Andrews, from Heiner to Wilson—Portland cement concrete, \$9,470.60; wood block, 3-in., \$12,474.40; standard brick, \$11,774.60; V. F. brick, asphalt filler, \$10,911.10; sheet asphalt, \$10,040.70; asphaltic concrete, \$10,066.30; Westrumite, \$11,218.50. Rob-in St., from Smith to Heiner—Westrumite, \$8,598.50; Portland cement concrete, \$7,185.70; wood block, 3-in., \$9,745.70; standard brick, \$8,985.70; V. F. brick, asphalt filler, \$8,505.70; sheet asphalt, \$7,785.80; asphaltic concrete, \$7,785.80. Polk St., from Milam St. to Smith St.—Portland cement concrete, \$6,093.75; wood block, 3-in., \$9,701.70; bitulithic, \$8,129; standard brick, \$8,355.25; V. F. brick, asphalt filler, \$8,105.20; sheet asphalt, \$7,203.95; asphaltic concrete, \$7,230.45; Westrumite, \$7,987.25; Uvalde rock asphalt, \$7,048.05.

Houston, Tex.—Auditor Washburn has been ordered to readvertise for bids for labor and material for paving Brunner Ave. and for 3,900 yds. of shell for Navigation Blvd. County engineers have been ordered to prepare specifications for paving 3 miles on old Richmond road with shell.

Rogers, Tex.—Good roads election here for issuance of \$250,000 in bonds resulted in victory for good roads movement. It is contemplated that about 60 miles of road will be built with proceeds of issue.

Ogden, Utah.—Notice of intention to repave, recurb and regutter 25th street, from Washington to Wall avenues, and Wall avenue, from 24th to 25th streets, has been published, and City Engineer Washington Jenkins states that plans and specifications will be ready for contractors shortly. Estimated cost, \$62,000.

Bristol, Va.—Upon authority of City Council, street department will at once give order for road oil to be used in treating streets to keep down dust during coming summer. It is probable that two cars will be purchased. All of principal macadamized streets will be given treatment of oil.

Bristol, Va.—Cutter, May & Co., bond dealers of Chicago, have purchased road bonds issued by Smyth county, Va., to extent of \$185,000.

Madison, Wis.—State industrial commission has authorized bond issue of \$1,500,000 of gold bonds, to pay 4 per cent. interest, on condition that these bonds be sold for not less than 75 per cent. of their face value. Receipts are to be used for improvements of roadways.

Rice Lake, Wis.—City commissioners have let contract to E. A. Dahl, of Duluth, to put in four blocks of street paving on Main street, for something over \$30,000. Creosoted blocks will be used.

CONTRACTS AWARDED.

Mobile, Ala.—By Mobile County Board of Revenue and Road Commissioners to Ferry & Vaughan, at \$11,345, to improve Spring Hill avenue, from Catherine street to Moffat road. F. McClure is county engineer.

Little Rock, Ark.—By Pulaski Road Improvement District No. 5 to McCarthy & Peay, Little Rock, at \$34,765, to build 12th street pike. Hugh R. Carter is engineer, New State Capitol.

Tucson, Ariz.—To Arizona Asphalt Co., contract for paving Stone avenue, by City Council, and 12th street grading contract was awarded to Griffith & Pacheco. Paving bid of Arizona Asphalt Co. was \$41,885.74.

Oakland, Cal.—By city commissioners, contract to F. H. Dahnke for grading, curbing, guttering, oil macadamizing and constructing of sidewalks and conduits on 74th avenue, between East 14th street and northeastern line of Searls tract.

Waterbury, Conn.—By Board Public Works for repaving with split granite block, Main St., to Barbara & D'Aurio, Waterbury, at about \$7,000.

Apopka, Fla.—By city to W. L. Pannell, Apopka, for cement paving, at cost of \$3,000 to \$4,000. S. W. Elderedge is chairman Street Committee.

Chicago Heights, Ill.—Bids for paving of large number of streets in First ward have been opened by Board of Local Improvements, in City Council chamber. The Chicago Heights Coal Co. was successful bidder at \$141,662.97. There were three other bidders, as follows: Pronger & Fletcher, Blue Island, \$143,535.26; James A. Sackley Co., Chicago, \$150,998.36; Smith & Brown, Chicago, \$153,037.40. Itemized bid of successful bid of successful bidder is as follows: 57,554.83 square yards of paving, at \$2.12, \$122,016.24; 5,805.79 feet of 6x18 concrete curb, at 60 cents, \$3,483.47; 27,268.79 feet of 5x18 concrete curb, at 50 cents, \$13,634.40; 836.75 feet of 4x12 concrete curb, at 25 cents, \$209.19; 628.47 feet of 3x12 oak header curb, at 25 cents, \$94.27; 1,278 feet of crossing curb, at 40 cents, \$383.40; 142 cast iron cross-plates, at \$4 each, \$568; adjusting 78 manholes, at \$3 each, \$234; adjusting 74 catchbasins, at \$5 each, \$370; 12 catchbasin inlets, at \$15 each, \$180; 3 catchbasins, at \$35 each, \$105.50 feet of 8-inch tile pipe sewer, at 50 cents, \$25; 450 feet of 10-inch tile pipe sewer, at 80 cents, \$360; total, \$141,662.97.

Chicago, Ill.—For constructing concrete curb, grading and paving with repressed vitrified paving brick on two inches of sand and six inches of Portland cement concrete, joints filled with coal tar, surface dressed with one-fourth of inch of sand, roadway of public alley in block bounded by Lincoln Ave., Sedgwick St. and Garfield Ave., to Central Paving Co. For similar work in alley in block bounded by Dean, Brigham and North Paulina Sts., to Peter J. O'Brien.

Chicago, Ill.—Contracts for constructing 6-ft. cement sidewalks on five streets have been awarded to Siewert-Callsen Co.; on five streets to Albert Graff; on six streets to Andrew Larsen; on one street to P. F. Blesen; on three streets to G. Kehl & Son Co.; on four streets to A. C. Skafgard; on two streets to August Witt, and on one street to Daniel Ryan. G. A. Schilling is president of Board of Local Improvements.

Quincy, Ill.—Board of local improvements opened bids for paving of Hampshire street from east line of 18th to west line of 24th, paving to be laid with concrete base and bituminous coal tar compound filled macadam wearing surface. Following bids were made: Joseph Eiff & Sons, \$13,675; Rees Bros., \$13,650. The contract was awarded Rees Bros.

Springfield, Ill.—Contracts for paving of East Adams and Cedar streets have been awarded by Board of Local Improvements. Work on pavements will be commenced within next two weeks, and will be pushed rapidly. Adams street will be paved from Seventh to Tenth streets by Capital City Construction Co., of this city, which was awarded contract. Company's bid was \$1.69 per yard for paving, 27 cents per foot for replacing old curbing, and 52 cents per foot for placing new curbing. Cedar street will be paved from Second street to alley west of Pasfield street. Henry Nelch & Sons, of this city, were successful bidders. Bids call for \$1.54 cents per yard of paving and 55 cents per foot for curbing.

Fort Wayne, Ind.—By County Commissioners contracts for stoning three roads. Conners road in Pleasant Township is to

be stone for length of 15,748 ft. by T. C. Gordon Co. on bid of \$12,735. Mathias Conners is superintendent. The Erie Stone Co. will stone 5,010 ft. of Rohrbach road on line between Madison and Marion Townships on a bid of \$4,798. M. Rohrbach is superintendent. Harkenrider road in Pleasant Township is to be stoned for 15,807 ft. by A. H. Fry Co. on bid of \$14,871. Estimate was \$16,901.80. Michael Harkenrider is superintendent.

Hartford City, Ind.—By Board of Commissioners contract for Stallsmith road to Harry Clamme, for \$4,443.88. Other bids were: Frank S. Smith, of Bluffton, \$4,847; L. W. Rook, of Dunkirk, \$4,500.

Indianapolis, Ind.—Board of Pub. Wks. has awarded contracts for paving streets aggregating approximately \$300,000. Contracts were awarded to low bidders on grade of materials selected and all contracts were awarded as recommended by B. J. T. Jeup, City Engr. Contracts were awarded as follows, price given being on lineal foot basis on each side of street: Illinois St., from 16th to 21st Sts., Republic Construction Co., first grade asphalt, \$2.47; Illinois St., from 21st St. to Fall Creek, Republic Construction Co., first grade asphalt, \$2.12; Dearborn St., from Washington to New York Sts., Republic Construction Co., second grade asphalt, \$2.55; Dearborn St., from New York to Michigan Sts., Republic Construction Co., second grade asphalt, \$3.45; Dearborn St., from North to 10th Sts., Republic Construction Co., second grade asphalt, \$2.53; Arlington Ave., from Washington St. to Pennsylvania Railway tracks, Marion County Construction Co., bituminous concrete, \$2; Broadway, from 38th to 43d Sts., Republic Construction Co., second grade asphalt, \$2.92; Kentucky Ave., from first alley northeast of South St. to Sand St., Marion County Construction Co., first grade asphalt, \$3.34; Rural St., from Michigan to 10th St., Republic Construction Co., first grade asphalt, \$3.40; Johnson Ave., from Washington St. to Pennsylvania Railway tracks, Marion County Construction Co., first grade asphalt, \$3.20; Norwood St., from New Jersey to Alabama St., Marion County Construction Co., first grade asphalt, \$3.10; 36th St., from Illinois St. to Capitol Ave., American Construction Co., second grade asphalt, \$3.45; 31st St., from Delaware St. to Central Ave., Republic Construction Co., second or third grade asphalt, \$2.29 or \$2.31; Gray St., from Michigan to 10th St., American Construction Co., first grade asphalt, \$2.90; Dequincy St., from New York to Michigan St., Republic Construction Co., second grade asphalt, \$2.55; 34th St., from Central to College Ave., Republic Construction Co., second grade asphalt, \$2.62, and 16th St., from Coyner to Tacoma Ave., Republic Construction Co., second grade asphalt, \$2.40.

Kokomo, Ind.—By Commissioners, contracts for roads as follows: Johnson road, Howard Township, to Scuyler Kelly, of Windfall, at \$2,229; Campbell road, Howard Township, to Maloney Bros., of Lafayette, at \$2,577; Lewellen road, Taylor Township, to Maloney Bros., of Lafayette, at \$3,844; Hicks road, Clay Township, to John R. Goodier, of Kokomo, at \$2,787; Addington road, Center Township, to Chaffin & Addington, of Kokomo, at \$7,999.

Winchester, Ind.—County commissioners met for letting of six roads. They are the A. J. Lasley road, Thomas J. Lasley road, Whiteriver Township, Omar W. Brown road, Greensfork Township, Henry Mundhenk road, Jackson Township, all of which were let to Stace Katey of this city. The Frank Devor road in Jackson Township was let to Henry Longnecker, and the William L. Chenoweth road in Wayne Township to A. T. Coggeshall.

El Dorado, Kan.—For improving Central Ave. and Merchant St., 11,473 sq. yds. brick pavement; 4-in. concrete base to Reed & Jarrison, El Dorado, at \$20,448. Next lowest bidders are: Midwest Eng. & Constr. Co., Ft. Scott, \$21,444; Thogmartin & Gardiner, Ft. Scott, \$21,645; Geiger Constr. Co., Ft. Worth, \$21,950.

Louisville, Ky.—Fiscal Court has awarded contracts for reconstruction of roads in Jefferson County, contracts amounting to about \$65,000. Bids were opened a week ago and referred to road committees of districts, which recommended acceptance of lowest bid in each instance. Following are contracts awarded: For reconstruction of two miles of the Shelbyville road, \$15,676.50, to F. G. Breslin and the Hoke Company; for reconstruction of one-half mile of Westport road, \$3,876, to F. G. Breslin and Alex. Stebler; for reconstruction of one mile of the Pope Lick and Middletown road, \$4,495, to Durrett Const. Co.; for 2,000 yds. of rock for Anchorage

and Pewee Valley road, \$3,625, to Edgar Cox; for 2,000 yds. of rock for the Routt road, \$2,500, to the Hoke Company; for reconstruction of two miles of the Bardstown road, near Buechel, \$3,663, to the Southern Asphaltolene Road Co.; for 1,000 yds. of rock for the Poplar Lehigh road, \$840, to the R. B. Tyler Co.; for reconstruction of one mile of old Third St. road, from Oakdale to Douglas Park road, \$1,667, to M. S. Davidson; for one-half mile of the Douglas Park road, \$1,557, to Kames & Jones; for original construction of one mile of Penile Schoolhouse road, \$4,075, to Henry Bickel Co.

Lake Charles, La.—By police jury to construct 43 miles road, aggregating \$100,000, as follows: Worthington Construction Co., Brookhaven, Miss., at \$32,996.03, Gillis highway, and at \$28,065.18, Hayes Thornwell highway; Healy Construction Co., Meridian, Miss., at \$77,884.65, Calcasieu Lake highway and feeder; Southland Construction at \$11,317.59, Lockport and Houston River highways. E. C. House is county clerk.

Lake Charles, La.—Contracts for road work, amounting to \$100,000, have been let by Police Jury after bids, previously submitted, had been tabulated by Highway Department. There were four separate contracts, and five bidders on each contract. Successful bidders were: Gillis highway—Worthington Const. Co., \$32,996.03; Calcasieu Lake highway and feeder—Healy Const. Co., \$77,884.65; Hayes-Thornwell highway—Worthington Const. Co., \$28,065.18; Lockport and Houston river highways—Southland Const. Co., \$11,317.59. Altogether about 50 miles of highways are provided for in these contracts.

Annapolis, Md.—For building South river road, to W. F. A. Duvall, at \$47,294.87, and is to be of concrete.

Annapolis, Md.—By State Roads Commission, contract to Winonts & Co., Brown Station, New York, for improvement of section of state road in Anne Arundel County, from Mt. Zion to Birds-ville, a distance of 4.51 miles, construction to be of gravel.

Baltimore, Md.—The D. M. Andrew Co. before Board of Awards has submitted what is regarded as lowest price ever offered for laying cement pavements in alleys throughout city, offering to do this work for \$1.20 a square yard under specifications of paving commission. Award will not be made until bids offered have been tabulated.

Elkton, Md.—To Juniata Paving Co., Philadelphia, Pa., at \$33,978.40, to build 3.15 miles concrete road from Georgetown to Mill Creek.

Flint, Mich.—To Robert Garner, of this city, contract for construction of brick pavement on Holman St. from Kearsley to Grand Traverse St. at cost of \$1,925.47.

Kansas City, Mo.—By city to Acme Paving & Construction Co., at \$11,500, to grade Beardsley avenue at intersection of 12th street.

Atlantic City, N. J.—For paving Baltic Ave. with creosoted wood block to Richard Lamb, 136 Liberty St., New York, at \$108,739. Dan'l H. V. Bell is city clerk.

Passaic, N. J.—By Board City Commissioners for laying asphalt-bound macadam (penetration method) and extension of 20-in. storm water sewer in Burkess Pl. to DeVogel Contr. Co., Passaic, at following bid: Asphalt-bound macadam, 7-in., per sq. yd., 91 cts.; reset curb, per lin. ft., 9.5 cts.; new manhole, \$45; 6-in. house connections, per ft., 50 cts.; manhole heads reset, each \$7; header curb, per ft., 52 cts.; 20-in. pipe sewer, per ft., \$1.50; concrete basins and conduit, per lin. ft., \$3.25; round bluestone corners, \$15; total, \$9,681.

Albany, N. Y.—Following are lowest bids received by State Highway Commission, Albany, N. Y., for construction of public highways by State Aid on May 11, 1914:

Road No. 1184—Elsmere-Bethlehem Center, Albany Co., 1.77 miles, J. P. Scanlon, Albany, N. Y., \$16,660.50.

Road No. 1173—Auburn-Union Springs, Cayuga Co., 9.62 miles, P. H. Maurray, Rochester, N. Y., \$93,820.60.

Road No. 1174—Victory-Cato, Cayuga Co., 5.51 miles, Semper Brothers, Watertown, N. Y., \$63,327.64.

Road No. 1175—Fair Haven Village, Cayuga Co., 1.82 miles, J. W. Brennan Co., Geneva, N. Y., \$29,573.05.

Road No. 5432—Horsesheds-Cayuta, Chemung and Schuyler Co., 8.93 miles, Peter F. Connolly, Waverly, N. Y., \$124,781.50.

Road No. 5454—Robbins Crossing, Chenango Co., 0.20 mile, Nathan E. Young, Harpursville, N. Y., \$3,432.

Road No. 1051—Matteawan Village, Dutchess Co., 1.28 miles, Spuyten Duyvil Cons., New York City, \$25,937.

Road No. 5463—LeRoy-Caledonia, Genesee Co., 3.24 miles, Lewis H. Brotsch, Rochester, N. Y., \$28,938.50.

Roads No. 1149—Ellisburg Village, and No. 1150—Belleville Village, Jefferson Co., 2.81 miles, Semper Brothers, Watertown, N. Y., \$33,783.15.

Road No. 574-A—Fairport-Nine Mile Point, Monroe Co., 6.89 miles, Ripton-Murphy, Rochester, N. Y., \$92,964.50.

Road No. 648—West Henrietta-Wesh Rush, Monroe Co., 7.57 miles, John M. Fitzwater, Romulus, N. Y., \$74,875.10.

Road No. 5461—Camden-Taberg, Pt. I., Oneida Co., 3.43 miles, Newport Cons. Co., Herkimer, N. Y., \$39,312.75.

Road No. 5465—West Winfield-Bridge-water, Oneida, Otsego and Herkimer Cos., 6.97 miles, Alonzo Schaupp, Bainbridge, N. Y., \$41,230.

Road No. 5470—Syracuse-Cicero, Onondaga Co., 6.70 miles, Newport Cons. Co., Herkimer, N. Y., \$84,396.92.

Road No. 5396—Solvay Village-Genesee St., Onondaga Co., 0.69 mile, Ballard & Maher, Oneida, N. Y., \$24,392.40.

Road No. 5348-A—Genesee-Jasper, Steuben Co., 1.22 miles, Defiance Corp., Ticonderoga, N. Y., \$8,964.

Road No. 5349-A—Painted Post-Addison, Pt. 3, Steuben Co., 2.14 miles, Bradley & Nolan, Corning, N. Y., \$18,473.30.

Road No. 5471—Owego-Candor, Pt. 2, Tioga Co., 9.08 miles, Peter F. Connolly Co., Waverly, N. Y., \$74,746.

Road No. 1118—Chestertown-Hague, Pt. 2, Warren Co., 5.84 miles, Caesar A. Rossi, Torrington, Conn., \$84,400.50.

Road No. 5355—Tuckahoe-White Plains, Pt. 1, Westchester Co., 2.43 miles, Louis Pitrillo, Mt. Vernon, N. Y., \$70,637.

Following are lowest bids received by State Commission of Highways, Albany, N. Y., for repair of public highways by State Aid, on May 11, 1914:

Rep. Con. No. 572, Road No. 5023—Cuba-Black Creek, Pt. 1, Allegany Co., Thomas Murray, Le Roy, N. Y., \$17,638.25.

Rep. Con. No. 576, Road No. 267, Castle Creek, and No. 420, Vestal, Broome Co., T. H. Hill Co., Great Bend, Pa., \$6,463.66.

Rep. Con. No. 495, Roads No. 510, Homer-Tully, Sec. 1, and No. 595 Homer-Tully, Sec. 2, Cortland Co., Lane Cons. Corp., Meriden, Conn., \$8,014.

Rep. Con. No. 556, Road No. 216—Roxbury, Delaware Co., Gruner & Hallenbeck, Harriman, N. Y., \$1,743.60.

Rep. Con. No. 575, Road No. 796—Greenville-Coxsackie, Pt. 1, Greene Co., Henry McNamee, Eddyville, N. Y., \$9,568.58.

Rep. Con. No. 555, Roads No. 776, Otego-Wilsey's Corners, and 5153, Wells Bridge-Otego, Otsego Co., Schunnumunk Cons. Co., Highland Mills, N. Y., \$3,423.30.

Rep. Con. No. 557, Road No. 708—Sidney-Unadilla, Otsego Co., Schunnumunk Cons. Co., Highland Mills, N. Y., \$3,423.40.

Rep. Con. No. 558, Roads No. 5086, Gallupville-Vrooman, and 5195, Vrooman-Howe's Cave, Schoharie Co., T. H. Gill Co., Great Bond, Pa., \$9,894.11.

Rep. Con. No. 533, Roads No. 681, Ithaca-Dryden, Sec. 1, and No. 5225, Varna Crossing, Tompkins Co., Wm. Hazard, Trumansburg, \$5,482.45.

Rep. Con. No. 589, Road No. 683—Dryden-Cortland, Tompkins Co., Wm. Hazard, Trumansburg, \$4,237.12.

Rep. Con. No. 542, Roads No. 350, Highland-Gardner, Pt. 1, and No. 231, Post Road, Ulster Co., Edward Hartney, Modena, N. Y., \$10,792.72.

Rep. Con. No. 569, Road No. 229—Kingston-High Falls, Ulster Co., Wm. Doyle, Saugerties, N. Y., \$4,163.18.

Rep. Con. No. 566, Roads No. 151, Turk Hill-Putnam Co. Line, No. 262, Peekskill-Salem Center, Sec. 2, and No. 261, Peekskill-Salem Center, Sec. 1, Westchester Co., Murray-Gardner, Inc., Center Moriches, \$15,342.72.

Oswego, N. Y.—Contractor John Hendrick presented only bid on East Second St. pavement from Cayuga St. to point half way between Seneca and Schuyler Sts. His bid was \$2.41 per yd. for Better brick and \$2.47 for Metropolitan brick.

Syracuse, N. Y.—City abandons asphalt repair plant and has awarded contract for resurfacing to Warren-Quinn Asphalt Co. at 98 cents per square yard.

Bismarck, N. D.—Bid of M. P. Moore for construction of sidewalks in city during current season has been accepted at 14 cents per square foot for cement walk and 30 cents per cubic yard for excavation and filling, contract directed to be drawn.

Lima, O.—To Henry S. Enck, 539 West Market street, contract to build state road from city limits at West street to grounds of Lima State Hospital, at \$30,995.

Harrisburg, Pa.—Bids were opened May 5 by State Highway Commissioner Bigelow on 6 State-aid contracts and one State Highway Route contract. Latter was awarded to A. V. Purnell, of Pittsburgh, Pa., at \$12,988.83. Following were bids received: Blairsville Borough, Indiana County—The Bell-Bockel Company, Inc., of Altoona, Pa., at \$20,999.45, this firm being the low bidder. Curwensville Borough, Clearfield County—Curwensville Const. Co., of Curwensville, Pa., at \$30,099.13, this firm being the low bidder. Clearfield Borough, Clearfield County—George I. Thompson & Co., of Clearfield, Pa., at their corrected bid of \$12,007.54. The firm's bid as submitted was for \$11,996.54, but in checking up the figures on their bid a clerical error was discovered which raised the figures to the amount at which it was awarded, this being still the lowest bid received. Great Bend Township, Susquehanna County—Breese & Church, of Elmira, N. Y., at \$16,343.94, this firm being the low bidder. Susquehanna Depot Borough and Oakland Borough, Susquehanna County—Breese & Church, of Elmira, N. Y., at \$10,682.60, this firm being the low bidder. Galetton Borough, Potter County—Only bid received was rejected by Commissioner Bigelow and he ordered contract re-advertised, as figure on bid was 20% above estimate of State Highway Department. Bids were as follows: Blairsville Borough, Indiana County, 3.176 ft. of brick block paving—West Penn Const. Co., New Kensington, Pa., \$22,628.02; John Herrmann, Latrobe, Pa., \$24,679; Thos. Arrigo, Charleroi, Pa., \$25,682.20; M. O'Herron & Co., Pittsburgh, Pa., \$22,721.90; Bennett & Shearer, Indiana, Pa., \$22,377.42; Thompson & Matson, Brookville, Pa., \$22,025.71; Simpson-Mitchell Co., Punxsutawney, Pa., \$21,916.79; Baker-Owen Const. Co., Johnstown, Pa., \$22,117.12; Chas. T. Eastburn Company, Yardley, Pa., \$23,066.65; Hoblitzell & Price, Meyersdale, Pa., \$21,963.17; John W. Hallam, Washington, Pa., \$24,094.32; John T. McGuire & Co., New Brighton, Pa., \$21,527.34; Bell-Bockel Co., Inc., Altoona, Pa., \$20,999.45. Next bid opened was for 5,806 ft. of brick block paving on a concrete foundation and asphaltic bituminous macadam, penetration method, on a telford foundation in Galetton Borough, Potter County—Only bid received on this was from Horn & Devling, Galetton, Pa., at \$32,169.10. Third bid opened was for 6,945 ft. of brick block paving in Curwensville Borough, Clearfield County—The bids on this were as follows: Bell-Bockel Company, Inc., Altoona, Pa., \$32,231.03; Simpson-Mitchell Co., Punxsutawney, Pa., \$32,131.24; Baker-Owen Const. Co., Johnstown, Pa., \$32,781.90; Chas. T. Eastburn Company, Yardley, Pa., \$36,247.92; John W. Hallam, Washington, Pa., \$37,217.57; Curwensville Const. Co., Curwensville, Pa., \$30,099.13; B. H. Coryell, Williamsport, Pa., \$35,943.25. Next bid was for 1,963 ft. of brick block paving in Clearfield Borough, Clearfield County—Bids received on this were as follows: Bell-Bockel Company, Inc., Altoona, Pa., \$12,587.84; Thompson & Matson, Brookville, Pa., \$12,662.38; Simpson-Mitchell Co., Punxsutawney, Pa., \$12,392.54; Geo. I. Thompson & Co., Clearfield, Pa., \$12,007.54; Baker-Owen Const. Co., Johnstown, Pa., \$13,077.43; Chas. T. Eastburn Company, Yardley, Pa., \$14,811.70; Gregory Paving Company, Lewistown, Pa., \$13,122.40; B. H. Coryell, Williamsport, Pa., \$13,833.14; John W. Hallam, Washington, Pa., \$13,337.05; Curwensville Const. Co., Curwensville, Pa., \$12,588.79. Three bids were received for 5,683 ft. of asphaltic bituminous macadam, penetration method, in Great Bend Township, Susquehanna County—Bids were as follows: Neff-Horn & Co., Slatington, Pa., \$18,612.87; Breese & Church, Elmira, N. Y., \$16,343.94; T. H. Gill Company, Great Bend, Pa., \$16,754.87. Next bid opened was for 2,338 ft. of brick block paving on a concrete foundation and asphaltic bituminous macadam, penetration method, on a telford foundation in Susquehanna Depot Borough and Oakland Borough in Susquehanna County—Bids received on this work were as follows: Neff-Horn & Company, Slatington, Pa., \$13,095.23; W. E. Bennett, Lanesboro, Pa., \$10,975; Breese & Church, Elmira, N. Y., \$10,682.60; Matthew J. Best, Philadelphia, Pa., \$12,497.80. Two bids were received on State Highway contract which is on Sproul Route No. 120 in Turtle Creek Borough, Allegheny County—Length of proposed road is 1,891 ft. and is to be of brick block paving. Specifications provide that foundation may be taken from Turtle Creek which runs alongside of road and for excavation of which last legislature appropriated \$10,000; A. V. Purnell, of Pittsburgh, Pa.,

bid \$12,988.83 with understanding that slag is to be furnished by contractor to be used for foundation of road. He also submitted a bid of \$30,027.60, foundation to be taken from Turtle Creek. R. H. Cunningham & Sons, of Turtle Creek, Pa., bid \$31,302.56 on this work.

Woonsocket, R. I.—For straightening and widening of Bertenshaw corner to S. Brien & Son at about \$1,400.

Houston, Tex.—Contracts for road work and for material have been made by the County Commissioners. Contract for paving Clinton road for distance of 3.33 miles was granted to Ed. McKinney, on bid of \$4,811.12. Inman, Nelms & Co. received order for 7,300 yds. of gravel for road, on their bid of 97 cts. White Oak road will be paved for one mile with gravel by W. A. Scott, who bid \$1,645. Among other contracts were following: Couch & Holliger, for topping gravel, at \$1.45 a cu. yd.; Suderman & Dolson, three cars shell at Pasadena, at 92 cts. a cu. yd.; repairs to Lynchburg Ferry, C. Derrick, at \$445.

Dallas, Tex.—Contract has been awarded to Martin Conley to grade Wilkingham road for distance of about two miles along Mountain Creek. Conley's bid was 14.49 cents per cubic yard for grading, and 1 cent additional for over-haul beyond 200 feet.

San Antonio, Tex.—Contract has been signed with the Texas Hardware & Manufacturing Co. by Mayor Brown for minimum of 25,000 sq. yds. of mesquite wood blocks and maximum of 75,000 sq. yds. to be used for paving material in San Antonio.

Salt Lake City, Utah.—For street improvements, as follows: Sidewalk extension No. 168, to G. A. Heman, \$11,458; curb and gutter extension, H. G. Glickerson, Salt Lake City, \$10,117.

Moundsville, W. Va.—By city contract to Ward & Patrick, Wheeling, W. Va., to construct 47,000 yds. vitrified block paving. J. G. Purder is City Secy.

Everett, Wash.—Bids have been opened for constructing two concrete culverts on permanent highway No. 2, as follows: J. B. Snyder, \$2,059.75; Ole Reinseth, \$1,782.62; American Pile Driving Co., \$2,187.08; Elliott Const. Co., \$2,921.10; Henry Bros., \$1,498; Pugh & Arenz, \$2,074.30; H. S. Wright, \$1,524.96; Everett Const. Co., \$1,411.12; F. K. Ffolliott, \$2,359.35. On motion, bid of the Everett Const. Co. was accepted. Bids were opened for constructing permanent highway No. 7, as follows: Henry Bros., \$18,790; Bancroft & Snyder, \$18,211; Elliott Const. Co., \$18,612; Pugh & Arenz, \$18,888; D. H. Traphagen, \$18,250; N. W. Ball, \$19,397; Atlas Const. Co., \$18,700; F. K. Ffolliott, \$18,638. On motion, bid of Bancroft & Snyder was accepted.

Seattle, Wash.—City Engineer has returned bids on following contracts to Board of Public Works with recommendation that contract be awarded to lowest bidder. Courtland Place grading, etc., J. H. Cullen & Co., low bidder, \$27,772; Shoreland Drive, H. Young, low bidder, \$4,803.45; Sixth Ave South, asphalt top, F. McLellan, low bidder, \$28,240.80.

Green Bay, Wis.—By city to White Construction Co. for following work: For construction of asphalt pavement on Jackson St., from south line of Walnut to north line of Mason except intersection of Crooks St. to White Construction Co., for sum of \$17,128. For construction of asphalt pavement on Jackson St., from the south line of Mason St. to the north line of Grignon, except the intersection of Porlier St., for sum of \$22,100. For construction of asphalt pavement on E. Mason St., from east line of Webster Ave. to East River, together with intersections, for sum of \$27,876. For construction of asphalt pavement on Oakland Ave., from south line of Walnut St. to north line of School Place, for sum of \$5,520. For construction of asphalt pavement on School Place, from west line of Ashland Ave. to Slough, for sum of \$2,676. For construction of asphalt pavement on Cora St., from the west line of Oakland Ave. to Slough, for the sum of \$1,629. For construction of asphalt pavement on Christiania St., from the west line of Oakland Ave. to the Slough is hereby awarded to White Construction Co., for sum of \$2,147. For construction of asphalt pavement on Van Buren St., from south line of Crooks St. to north line of Grignon St., except the intersections of Mason St. and Porlier St., at \$29,160. For construction of an asphalt pavement on Cass St., from the east line of Webster Ave. to the east line of Clay St., and on Clay St., from Cass St. 186 ft. south.

Janesville, Wis.—For improvements on St. Lawrence avenue, Count, Garfield and Carrington streets to Gund-

Graham Co., of Freeport, Ill., at \$9,951.30.

Niagara Falls, Ont., Can.—Proposition of contractor Alonzo B. Robertson to build brick pavement from north to south end on percentage plan has been accepted by City Council. Robertson is to receive 15 per cent. of total cost of pavement, which will be about \$173,454.

SEWERAGE

Camp Hill, Ala.—On May 25 city will vote on \$8,000 bonds for sanitary sewer system. Edgar B. Kay, Tuscaloosa, Ala., is engineer.

Gadsden, Ala.—About \$22,000 will be spent in extension of sewers.

Lodi, Cal.—City Clerk has been instructed to order 2,960 ft. of various sized sewer pipe for storm sewers of E. Pine St., together with 5 manholes, 20 catchbasins and 20 increasers, at cost of \$884.60.

Bridgeport, Conn.—Bond issue of \$300,000 has been voted for sewers.

Southington, Conn.—Report of Sewer Commission shows that estimates call for \$127,721 for total work, of which proposed first unit would cost \$91,206 for sewer construction, and \$27,170 for disposal plant, making total of \$118,376. Total length of sewers planned is 21.4 miles. Total length recommended for first unit construction by City Waste & Disposal Co., of New York City, is 13.1 miles.

Canton, Ill.—Sewer Committee is considering purchase of sewer cleaning machine.

Council Bluffs, Ia.—With main sewer district No. 1, or West Council Bluffs sewer system, almost completed, Assistant City Engineer E. F. Stimson is working on plans for sewer district No. 2 to be presented to city council within short time. District No. 2 is to include section of city lying between 8th and 14th Sts. and Avenue C and Avenue G, in northern part of city. Plans under preparation provide for connection with forty-eight inch sewer main at 13th St. and Avenue C, which is main for all of city lying east of 14th St. This is brick sewer. From Avenue C north on 13th St. new plan provides for drainage main, thirty-six inches in diameter at south end and eighteen at north. From this will be carried fifteen mains to east and ten-inch mains to west.

Chestertown, Md.—Proposition to issue \$25,000 of bonds for sewers and streets has been carried.

Haverhill, Mass.—See "Streets and Roads."

Simsconset, Nantucket, Mass.—Following were bids received on unit cost system for sewerage system: A. Williams & Co., 3 Cotting St., Boston, Mass., \$8,034.98; D. D. Pietro, 424 Hanover St., Boston, Mass., \$8,061.65; Alberto & Balboni, 7 Harvey St., Roslindale, Mass., \$8,094.35; Martino D. Mateo, 146 Dudley Ave., Roslindale, Mass., \$8,687.60; International Const. Co., 3 Tremont Row, Boston, Mass., \$8,788.25; New York Sewage Disposal Co., 37-39 E. 28th St., New York City, \$8,864.72; Thomas Bruno, 18 Tremont St., Boston, Mass., \$10,344.85; Falvey & Kelley, 15 Intervale Park, Dorchester, Mass., \$10,878; J. J. White Co., 63 William St., New York City, \$11,338.45; Antonio A. Caruso, 4 North Sq., Boston, Mass., \$12,240. Work consists of two miles of sewers, 8-in. to 12-in., screen chamber, dosing tank with intermittent siphon, and 1.33 acres of sand beds in four units. Robert Spurr Weston, 14 Beacon St., Boston, is Cons. Engr.

Fremont, Neb.—Enlargement of sewer system is being discussed. Estimated cost, \$10,000.

Milwaukee, N. J.—Voters have decided in favor of installation of sewer and water systems, in accordance with plans and specifications of Milwaukeew Sewer and Water Commission.

Newark, N. J.—A suggestion that municipalities of Northern Jersey join with New York City in gigantic scheme of sewage filtration in plant on Sandy Hook is being discussed.

Newark, N. J.—Newark will be asked to join with Verona in purchase of land for and establishment of sewage disposal plant. It is proposed to establish filtering system on plot near Peckman River at extreme north end of Verona Borough.

Paterson, N. J.—Ordinance has been adopted for construction of sewers in various streets. C. D. Cooke is President Board of Public Works.

Perth Amboy, N. J.—See "Water Supply."

Plainfield, N. J.—See "Streets and Roads."

Plainfield, N. J.—At meeting of Common Council bids for sale of \$30,000 worth of joint sewer construction bonds

were opened. J. D. Everett & Co. submitted highest bid for entire lot. Their proposal was \$30,175, and Council accepted it.

Westfield, N. J.—See "Streets and Roads."

Brooklyn, N. Y.—See "Streets and Roads."

Oswego, N. Y.—Bids will be received at office of undersigned in city of Oswego, N. Y., until May 18, 1914, at 12 o'clock noon, for purchase of \$110,000 4½ per cent. registered sewer bonds of said city. Thomas F. Hennessy is Mayor.

Schenectady, N. Y.—Board of Contract and Supply has approved plans of City Engineer Landreth for protecting city sewage pumping station from future flood troubles.

Schenectady, N. Y.—Board of Estimate and Apportionment will pass upon action of Common Council in relation to bond issues of \$300,000 for sewage disposal, \$100,000 for schools, and few odd thousands for other improvements.

Chillicothe, O.—H. M. Redd, City Engr., has reported to City Council that completion of Honey Creek reinforced concrete storm sewer, 7x10 ft., 3,280 ft. in length, will cost \$30,866.

Columbus, O.—An up-to-date sanitary sewerage system is greatly needed in opinion of Mayor John C. Cook, and subject is being discussed.

Lima, O.—Six important public improvements and involving expenditure of more than \$800,000 will be presented for consideration of City Council in its first May meeting. Six proposals are: Issue of bonds for \$400,000 to erect a sewage disposal plant with intercepting sewers; issue of bonds for \$100,000 to pay the city's proportion of new street pavement throughout the city as may be asked by property owners; issue of bonds for \$100,000 to build new trunk sewers where necessary and to provide sewers for new residence districts; issue of bonds for \$100,000 to lay new water lines as needed through the growth of the city; issue of bonds for \$75,000 to provide for better lighting of streets in business district and in residence sections; issue of bonds for \$35,000 under flood emergency act to build a new bridge at Pine St.; issue of bonds for \$775,000 will be proposed jointly by Mayor Robb and Service Director Askins.

Newcomerstown, O.—Plans are being prepared by H. L. Maddocks of Newark, for brick sewers to cost \$50,000, and for sewage treatment plants to cost \$12,000.

Youngstown, O.—Bonds in sum of \$1,915 will be sold at 2 p. m., May 18, for Frederick Ave. sewer; \$1,160 for Pyatt St. sewer, and \$1,850 for Champion St. sewer. D. J. Jones is City Auditor.

Erie, Pa.—Ordinance will be introduced in Council, authorizing bond issue of \$150,000. Of that amount, \$101,000 will be for parks and \$49,000 for sewers and conduits. It is probable that additional bond issue of \$22,000 will be made for City Hall improvements and for an aerial truck for Fire Department.

Erie, Pa.—See "Miscellaneous."

Erie, Pa.—Ordinances have been passed for construction of 9-in. diameter lateral sanitary sewers in several streets. M. J. Henry is Clerk of City Council.

York, Pa.—See "Streets and Roads."

York, Pa.—Specifications have been adopted for proposed extensions of storm water and sanitary sewer systems, and ordinance has been passed providing for construction of terra cotta house lateral sewers as part of sanitary sewerage system on S. Queen St., W. Philadelphia St., E. King St., W. King St., E. Princess St., S. Pine St., Cottage Pl. and College Ave.; and also terra cotta mains forming part of the system on West St., Hawthorne St., Belvidere Ave., W. Philadelphia St. and Royal St.

York, Pa.—The \$200,000 loan bill authorizing issuance of 4½ per cent. bonds to this amount to provide funds for extending and opening sanitary sewerage system, building additional storm water sewers, and paving streets, has been passed finally by City Council.

Artesian, S. D.—Sewerage system will be improved.

Dallas, Tex.—Bids will be asked in about month's time for sewage disposal plant.

Houston, Tex.—Mayor has been authorized to advertise for bids for construction of sanitary sewers on Robin, from Heiner to Smith; on Gano, from Loraine to Waverly; on Bagby, from McKinney to Rusk, and on Brazos, from Walker to Rusk, with 15-in. connections from the Eastwood sanitary sewers to McKinney Ave. sewer.

San Antonio, Tex.—Sewer contractors will be asked to submit bids to City Council for sanitary and storm sewers, to be laid on fourteen different streets.

San Antonio, Tex.—Plans have been received from Engineer Samuel M. Gray for the storm sewers in southeastern section of the city.

Wharton, Tex.—City Council has decided on construction of sewerage along Burleson St. by employment of labor by committee of aldermen, the mayor and city engineer. All bids submitted were considered excessive.

Seattle, Wash.—Plans have been approved for sewers in Seventh Ave. North.

Sheridan, Wyo.—A special election will be held in Sheridan May 26 for purpose of voting on bond issue of \$50,000 for extension of sanitary sewer system.

CONTRACTS AWARDED.

Augusta, Ga.—By city to Case & Cotharn, Candler building, Atlanta, Ga., at \$15,070.82, to construct sewers. Work consists of 1,120 feet 40-inch internal diameter; reinforced concrete, 680 feet 36-inch internal diameter; reinforced concrete, 680 feet 30-inch inside diameter; 500 feet 4-inch, 500 feet 20-inch and 1,300 feet 12-inch vitrified pipe; 5 manholes, etc.

Atlanta, Ga.—By city at \$8,912 for two-mile sewer construction, Group 2, to Dysard Construction Co., Atlanta.

Chicago, Ill.—For adjusting sewer manholes and catch-basins, constructing and connecting catch-basin inlets, constructing new catch-basins complete, curbing with sandstone curbstones supported at each joint by two cubic feet of Portland cement concrete, grading and paving with repressed vitrified paving brick on two inches of sand and six inches of Portland cement concrete, joints filled with asphaltic filler, surface dressed with one-fourth of an inch of sand, roadway of Montrose Ave. from easterly line of North Clark St. to westerly line of Evanston Ave. (now Broadway), to Citizens Construction Co.

Danville, Ill.—To E. R. Harding Co., Racine, Wis., contract, at about \$100,000, for brick sewers.

Ft. Wayne, Ind.—Following contracts have been awarded: Sewer in alley between Piqua Ave. and Victoria Ave., from Darrow Ave. to Rudisill Blvd., Moellering Construction Co., \$1.46 per lin. ft.; sewer in alley between Victoria and Calhoun, Darrow to Rudisill, Derheimer & Co., \$1.80 per lin. ft. Sewer in alley between Arlington and South Wayne, Rudisill to Branning, Derheimer & Co., \$1.25 per lin. foot.

Boston, Mass.—By Comr. Pub. Wks. for sewers in Kittredge St., Denton Terrace and outlet, West Roxbury, to Antony Cefalo, at \$23,868.

Franklin, Mass.—For constructing sewers, to Cenedella Bros., of Milford.

Manchester, Mass.—Bids have been opened for additional work in connection with Manchester's new sewerage system. One set of bids called for construction of well, from which sewage is to be pumped through force mains to outer harbor, and other set for construction of pipe line from this well out into ocean. All bids were so high for construction of well that new set of bids will be called for. Meanwhile test wells will be dug on lot to ascertain nature of soil and probable difficulties to be met in construction. Morley, Flatley & Co., of Manchester, put in a bid of \$28,177, and T. A. Scott Co., of New London, \$33,103. Both were rejected. Figures for building line of pipe out into ocean ranged from \$56,800 to \$65,000. T. A. Scott Co., of New London, were successful bidders, their figures being \$56,800. Other bidders were Merritt Chapman Dredging & Wrecking Co., New York; Joseph Gerrish, Boston; G. R. Gow Construction Co., Boston; G. M. Bryne, Boston.

Duluth, Minn.—On bid of \$37,597.50, C. W. Rood Construction Co., of Grand Rapids, Wis., was awarded contract for construction of County Ditch No. 2, a drainage project in Meadowlands district. In connection with ditch, about 20 miles of good roads will be built on waste banks when excavations are made. These roads will be well drained and surfaced and will, of course, follow lines of ditches. Contract for project as let to Rood Co. calls for following: Clearing and grubbing 24 miles of right of way, \$70 per mile; excavating 205,500 cu. yds. of earth, .119 cts. per cu. yd.; excavating 10 cu. yds. of rock, \$1.50 per cu. yd.; furnishing and placing 56 metal culverts, 15 ins. in diameter and 28 ft. long, \$22 each; furnishing and placing one metal culvert, 36 ins. in diameter and 28 ft. long, \$50; grading 21.44 miles of road, \$100 per mile; furnishing and building 18 steel bridges, each with a span of 18 ft., \$237 each; furnishing and building two steel bridges with 20-ft. spans, \$249 each; furnishing

WATER SUPPLY

and building one steel bridge of 24-ft. span, \$316; furnishing and building one steel bridge of 28-ft. span, \$346; furnishing and building two steel skeln bridges of 30-ft. span, \$410 each; 111,000 yd. stations haul at .016 cts. per yd. station.

Billings, Mont.—For construction of Carroll drain to Gagnon & Co. at \$12,275.60, drain is approximately 9,715 ft. long and will drain in neighborhood of 625 acres. Of drain's total length, 3,238 linear ft. are to be composed of 12 in. boxes, 2,662 ft. of boxes 12x14, and 3,815 ft. of boxes, 12x12 ins. In addition to the boxes there will be eight manholes, seven sumpholes and 11,340 linear ft. of surface ditches. Other bids presented were as follows: Hugh McDonald, \$13,381.40; Nowell-Atherly Co., \$14,893.51; E. Lindstrom, \$14,915.51, and Frank Savary, \$15,220.59.

Hammonton, N. J.—Contract for construction of laterals to big sewer plant at this place has been awarded to Central Construction Co., of Philadelphia, only firm to put in a bid.

Newark, N. J.—Twelve bids on Section 17 of trunk sewer have been opened by Passaic Valley Sewerage Commission. The lowest bid was that of the Culp Co., Inc., of this city and Brooklyn, who entered \$212,138.50 as their figure. Next lowest bid was that of Smith-McCormick Co., of Easton, Pa., who bid \$230,625. Third lowest bid was entered by Bruno & Pettitt, of Boston, whose figure was \$245,450. Section 17 runs along Market St., Paterson, to East Forty-third St., through East Side Park, to the Passaic River in Paterson. Bids will be held by commission for two weeks for analysis and consideration as to responsibility of bidders and fairness of their figures.

Olean, N. Y.—To Michael Furly, city, contract, at \$2,355.42, for sewers.

Rochester, N. Y.—To Meyers & McMillan, Pittsford, contract, at \$330,000, for sewage disposal plant.

Dayton, O.—Bids have been opened in office of Service Director Barlow for construction of storm water sewers on Fairview Ave., Pritz Ave. and Eaton Ave. On Fairview Ave., Boyd & Cook were low with their bid of approximately \$3,400; Shafer & Dill, on Pritz Ave., with bid of approximately \$1,200. Hecker & Kirchner were low bidders on construction of storm sewers on Eaton Ave., their bid being \$10,836.75. Estimate on this contract was \$12,500.

Dayton, O.—Boyd & Cook, contractors, were low in their bid of \$9,880 on construction of storm water sewers in Salem Ave. district. Shafer & Dill were low on Geyer St. sewer, their bid being \$1,932.25. They were also low on their bid for construction of storm water sewer on E. Second, Folkerth and Harshman Sts., their proposal being \$1,994.50. On Bowen St., paving, from Wyoming to Lorain St., H. E. Barney was low with his bid of \$13,116, and on Herman Ave. paving Yount & Jackson were low, with their bid of \$19,788.

Okmulgee, Okla.—City to R. G. Fritts, Okmulgee, at \$41,403 to construct sewers in districts 14, 15, 16 and 18. R. H. Jennes is city clerk.

Klamath Falls, Ore.—John H. Shannon has been awarded contract for construction of sewer to be laid on Canal street, between 10th and 11th streets. Shannon's bid was \$240 for labor and material.

Greenville, Tenn.—By city to Dabbs & Wetmore, Meridian, Miss., at \$30,206.51, to construct sewer system, about 7 to 9 miles sewers. C. H. Jenks, Union City, Tenn., is engineer.

Henderson, Tenn.—To D. W. Robins, Tupelo, Miss., at \$48,000, for Forked Deer drainage district, Chester County.

Richmond, Va.—By city to Saville & Clairborne at \$19,621.40 to construct 14th street Southside sewer, and to A. W. Maynard at \$5,525.35, sewer in William Byrd Park district.

Seattle, Wash.—Lowest bidder for construction of sewers in California Ave. was T. Ryan & Co., at \$78,713.58.

Seattle, Wash.—For constructing sewers on California Ave. to T. Ryan, Lowman Bldg., at \$78,713; also for sewers on 6th Ave. S. to F. McLellan, Globe Block, at \$28,240.

Chippewa Falls, Wis.—For constructing sewer on Main St. by Bd. Pub. Wks. to Pastoret Constr. Co., Duluth, Minn., at \$10,908. Other bidders: Thos. E. Wooley, La Crosse, \$13,033; Wm. Danforth, St. Paul, \$12,292; Ilstrup & Olsen, Minneapolis, \$12,136; Cast Stone Constr. Co., Eau Claire, \$11,964.

Stratford, Ont.—For approximately 1,650 ft. 5½-ft. concrete storm sewer arch, 2,940 ft. 2-ft. vitrified glazed pipe sewer, to Wm. M. G. Davies, Stratford, at \$19,724. A. B. Manson is City Engr.

Susanville, Cal.—Matter of bonding town to purchase water works came before City Trustees and it was decided to have State Highway Commission place valuation on present plant owned by F. Cady. Trustees will then bond for sufficient amount to make purchase.

Waterbury, Conn.—Board of Public Works voted to recommend to next meeting of Board of Aldermen that city issue bonds to amount of \$150,000 for installation of pumping station on Hecla St.

Manatee, Fla.—Election will be held on May 26 for voting on \$35,000 bond issue for water works.

New Bedford, Mass.—Petitions have been granted for extension of water main pipe.

Gloucester, Mass.—Water loan of \$30,000 has been awarded to Spencer, Trask & Co., of Boston.

Westfield, Mass.—Bids will be received until 11 a. m., by Water Commissioners for laying 8,230 ft. of 6-in. water pipe. J. L. Hyde is Town Engr.

Forsyth, Mont.—It has been decided to call election in near future to vote \$20,000 bonds to improve water works system and build City Hall and jail. Latter will cost \$5,000.

Three Forks, Mont.—Voters have decided in favor of bond issue for installation of water works and sewerage systems.

Hastings, Neb.—Ordinance has been adopted for construction of water mains in West Lawn Addition. A. T. Bratten is City Clerk.

Linden, N. J.—Ordinance granting a franchise to corporation to be known as Linden Water Co., and supplementary ordinance providing for five-year contract between township and company have been passed on first reading at meeting of Township Committee.

Milltown, N. J.—Voters have decided in favor of installation of water and sewer systems, in accordance with plans and specifications of Milltown Sewer & Water Commission.

Perth Amboy, N. J.—Board of Water Commissioners has decided to advertise for bids for furnishing and laying of 13,000 ft. of 30-in. cast-iron pipes from Runyon water works to standpipe at Ernston, between South Amboy and Runyon. Commissioners also decided to advertise for bids for 13,000 ft. of 30-in. force main on the assurance that the Board of Aldermen will issue water improvement bonds to the amount of \$190,000. City Engineer Mason estimates the buying of pipe and installation complete will cost \$65,000. Alternate bids will be received by Board at its next meeting, May 20. One will be for supplying of pipe, one for doing work, and another for furnishing pipe and installing same. The 13,000 ft. of pipe is estimated to cost \$45,000.

Perth Amboy, N. J.—Aldermen in committee session have practically decided to grant \$100,000 to Board of Water Commissioners for construction of a new, 30-in. main to boost water pressure; to pave New Brunswick and Amboy aves. at once; to place sewers in number of streets in northwestern section of the city and to view municipal electric light plant in Orange, with view of establishing similar one here.

Dunkirk, N. Y.—City is considering purifying its water supply by the hypochlorite of lime process.

Plattsburg, N. Y.—Bond issue of \$50,000 will be voted on for completing reservoir and purchase of additional land.

Rochester, N. Y.—Superintendent of Water Works Beekman C. Little is now considering installation of additional pump which will cost between \$3,000 and \$4,000.

Cincinnati, O.—City Commissioners have authorized Mayor Helmbold to enter into contract with Dr. Shaler Berry for extension of Southgate, Ky., water system.

Greenville, O.—Johnson & Fuller, Consulting Engineers, 150 Nassau St., New York City, have been retained to investigate and prepare plans for improved and additional water supply for city.

Lima, O.—See "Sewerage."

Lowellville, O.—Plan of James J. Durand, Jr., of Pittsburgh, for water works for Lowellville, has been read and ordinance providing for acceptance of proposition passed.

Ashland, Ore.—At meeting of Commercial Club it was determined to ask city to vote \$175,000 in bonds to be used in piping water from mineral springs to city, placing drinking pavilions and improving City Park.

Allentown, Pa.—Bond loan of \$39,500 has been voted for installation of municipal water plant.

South Allentown, Pa.—By vote of 170 to 44, at special election, South Allentown has decided to borrow \$40,000 for creation of municipal water plant.

Pittsburgh, Pa.—Committee has been appointed to inquire into cost of installing modern municipal water plant.

Artesian, S. D.—Better water system is being discussed.

Veblen, S. D.—Now that voters have authorized issuance of bonds in sum of \$16,000 for waterworks system, such system will be installed at earliest possible date. It is planned to secure water from large springs situated on tract of land which City Council purchased some time ago. Pressure tank will be erected near springs.

Corpus Christi, Tex.—Plans for municipal water plant will be discussed by Council. Plans were prepared by Alexander Potter of New York.

Salt Lake City, Utah.—As first step toward carrying out plans of city commission to increase water supply of Salt Lake and obtain reduction in insurance rates, commission has passed resolution directing city engineer to submit to it plans and specifications for \$100,000 pipe line to be constructed from Big Cottonwood to Thirteenth South St. Plans have been prepared by engineer and will be submitted at once so that contract may be let without delay.

Adamston, W. Va.—Sum of \$20,000 in bonds has been voted for water works and sewers.

Wheeling, W. Va.—City is considering installation of filtration plant.

Anacortes, Wash.—That project to bring water from south fork of Nooksack across divide to supply towns of the Skagit Valley is feasible was shown by report of Civil Engineer G. V. Elder to Chamber of Commerce on preliminary survey which he has just completed. Project would entail dam some 50 feet in height and tunnel of between 2,000 and 3,000 feet through divide.

Niagara Falls, Ont.—Work of constructing waterworks system for Stamford will be started within two months, according to Deputy Reeve Stokes. Council will meet in township hall to call for tenders on work of installing pipe line in Lundy's Lane. Total cost of waterworks system will be about \$12,000.

Niagara Falls, Ont., Can.—Bids will shortly be asked for constructing water mains.

Stamford, Ont., Can.—Bids will be asked for immediately for installation of water works system to cost about \$12,000.

CONTRACTS AWARDED.

Thomasville, Ala.—By city to Sullivan, Long & Hagerty Co., Bessemer, Ala., at \$18,000 for construction of water-works, work requires about 1,890 ft. 8-in. cast-iron pipe, 2,690 ft. 6-in. cast-iron pipe, 8,000 ft. 2-in. galvanized pipe, 14 double-nozzle hydrants, five 8-in. and six 6-in. gates, two 80,000-gal. concrete reservoirs, deep well, air-lift machinery, 2-state 750-gal.-per-min.-capacity pump; pump and compressor to be motor driven, with 220-24-volt 3-phase 60-cycle motors. Edgar B. Kay is engineer, Tuscaloosa, Ala.

Sacramento, Cal.—To Mark-Lally Co., of San Francisco, Cal., at \$30.50 per ton, for furnishing of pipes for extension of water mains.

Wilmington, Del.—By Board of Water Commissioners contract to supply department with new meters to Hersey Mfg. Co.

Carpentersville, Ill.—For installation of water works system, to Logan & Gierst Const. Co., \$19,467; other bids as follows: F. H. Inglehart, \$19,693.52; T. C. Brooks & Sons, \$19,989.22; J. M. Donahue, \$19,837.54; W. G. Hoy, \$20,245.16; P. W. Galloway, \$22,141.86.

Laporte, Ind.—By Board of Works for building of pumphouse at Kankakee pumping station, same to house new pump board has ordered and other pumping machinery. Contract price is \$1,695. Other bids were: Larson-Danielson Construction Co., \$1,975; Theo. A. Larsen, \$1,925; Fred Struss, \$1,750.

Muscantine, Ia.—Contract with MacDonald Engineering Co. for erection of pumping station in Drainage District No. 13, has been signed at joint meeting of boards of supervisors of Muscantine and Louisa County.

Mansfield, La.—By city to Bash & Gray, Joplin, Mo., at \$34,300, for construction of waterworks and sewer system. M. Griffin O'Neil & Sons, engineers, Dallas, J. W. Parsons is mayor,

Mattapoisett, Mass.—By Water Comrs. to Hanson Constr. Co., Boston, for extending water system to Crescent Beach at \$9,859.

Peabody, Mass.—Board has awarded contracts for 300 water meters of Nash AAX type 9, made by National Meter Co.; 100 Worthington meters, Model D; 100 Hersey Model F meters. Bids will be solicited for setting between 400 and 500 $\frac{1}{2}$ -in. meters.

Grand Rapids, Mich.—By Trustees for village of Grandville contract for installing water works system to the Hydraulic Engineering Co. for \$12,000. Pumps to be used are of the modern make and will be electrically driven. Source of water supply is from deep wells. Large steel reservoir will be built and 12,000 ft. of water pipe mains will be laid.

Grandville, Mich.—Hydraulic Engineering Co., of Grand Rapids, has been awarded contract for installation of complete water system for Grandville.

Tunica, Miss.—By city to Fairbanks & Co., New Orleans, La., at \$8,975, to construct waterworks, including 50,000-gallon tank. Contractors will furnish and install engine and pump, tank and tower, cast iron pipe, valves and hydrants.

Greenwood Lake Glens, N. J.—For water supply and sewer system for summer development, contract has been awarded as follows: water system, H. K. Corbin, 170 Broadway, New York, about 13,000 ft. pipe, cost \$22,000; sewers, Frank Puglia, 34 Cross St., Paterson, about 18,000 ft., cost \$21,000; disposal works, P. L. Braunworth, Montclair, cost \$14,680. Engineer is H. J. Harder, Paterson.

Brooklyn, N. Y.—For conduit and pipe lines from Fort Greene Park along Myrtle Ave., Washington Park and Wiloughby Ave. to Broadway, Brooklyn, to Beaver Engr. & Const. Co., 51 Chambers St., New York City, at \$298,908.

New York, N. Y.—By Bd. Water Supply for Contract 118 for constructing 11 superstructures along line of Catskill Aqueduct, in town of Philipstown, Cortland, Yorktown and Mt. Pleasant, Westchester Co., to A. L. Guidone & Co., 131 E. 23d St., N. Y. City, \$110,375. Other bids as follows: Torrington Bldg Co., Inc., Poughkeepsie, \$115,331; Hermans, Madden & Co., 103 Park Ave., \$127,146; Jos. E. Butterworth, 5 Colden Ave., White Plains, \$127,784; Chas. Meads & Co., 165 Broadway, \$131,190; Wm. H. Eagan, 147 E. 125th St., \$144,267; Thos. C. Carlin, Inc., 93 Garfield Pl., Brooklyn, \$147,392. Successful bidder bid for 10 siphon chambers, each \$9,500, and one siphon chamber, \$8,900; 2,000 bbls. Gray Portland cement, \$1.75, and 850 bbls. white Portland cement, \$1.75.

Schenectady, N. Y.—Bids have been opened for 6,000 ft. of cast-iron water pipe and were as follows: Cast Iron Pipe & Foundry Co., \$23.90 per ton; Standard Cast Iron Pipe Co., \$23.90 per ton; Chas. Millar & Son, \$22 per ton; Donaldson Iron Co., \$22.90 per ton; R. D. Wood & Co., \$21.75 per ton. Wood & Co. was awarded contract. Bids for laying pipe were as follows: W. D. Goodale, \$962.30; Kellam & Shafer Co., \$1,542; T. R. Crane, \$1,633; Ellis B. Edgar, \$2,267.50; Beckwith Bros., \$2,820.50; John L. Nolan, \$1,114; John Allen, \$1,317.50. W. D. Goodale was awarded contract. Following bids were offered for furnishing of valves and hydrants in connection with water main: Eddy Valve Co., valves, \$630, hydrants, \$687; Chapman Valve Co., valves, \$600; Ludlow Valve Co., valves \$600, hydrants \$658.80. Contract for valves was awarded to Chapman Co. and hydrants will be furnished by Ludlow Co.

Schenectady, N. Y.—Resolutions passed last week, placing contract for water gates with Chapman Valve Company and contract for hydrants with Ludlow Valve Company were rescinded. Another resolution was passed placing contract for both with Ludlow Valve Company.

Gastonia, N. C.—By city to Porter & Boyd, Charlotte, N. C., to construct settling basin with 7,000,000 gals. capacity.

Cleveland, O.—To J. F. Casey Co., of Pittsburgh, Pa., for building filtration plant.

Cleveland, O.—For filtration plant, to Chas. Fath & Co., 1125 Illuminating Bldg., at \$714,675.75.

Dayton, O.—To Union Water Meter Co., of Worcester, Mass., contract for furnishing approximately 1,170 meters.

Reading, Pa.—Number of contracts for water bureau supplies for year have been awarded by City Council. Contract for cast-iron pipe and special castings was laid over for further information. Contract for cast-iron gate boxes was awarded to Reading Scale & Machine Co.,

\$840. The only other bidder was Textile Machine Co., \$1,040. Item 3 water gates was awarded to Chapman Valve Co., at \$181.10. Bids for fire hydrants were rejected. Contract for disc meters was awarded to Thomson Meter Co., at \$4,279.50. Bids for compound meters were laid over. Contract for corporation cocks was awarded to Mueller Manufacturing Co., at \$189.50. Contract for laying water pipes and appurtenances was awarded to John E. Weidner, \$3,175. Joseph A. Martin was only other bidder, \$4,493.50.

Nashville, Tenn.—On total bid of \$2,133.75, board of city commissioners have awarded to P. A. McShane a contract for uncovering water mains in 14 stretches of streets.

Chehalis, Wash.—To W. H. Mitchell, for construction of 750,000-gal. reservoir for the water works system.

LIGHTING AND POWER

South Pasadena, Cal.—City has decided to adopt uniform system of ornamental electrolights throughout entire city. Standards are to be of steel, with copper sheathing.

East Norwalk, Conn.—Bonds in sum of \$20,000 have been voted for installation of electric generating plant. Electricity for operating municipal electric light system is purchased from South Norwalk.

Chicago, Ill.—Engineering committee of Sanitary District has voted to advertise for bids on 2,000 new nitrogen lamps; also for synchronous condensers.

Anderson, Ind.—City Engineer Funk has made report for system of street lights for uptown district; about 308 ornamental posts with 5 lights to each cluster will be required at cost of about \$30,000.

Anderson, Ind.—City Engineer Funk has completed plans for installation of ornamental lighting system in uptown district. Plans provide for 308 standards carrying 5-lamp clusters, to cost about \$30,000.

Indianapolis, Ind.—Plan for entering into temporary contract with Merchants Heat & Light Co. to put in and maintain electric street lights which Indianapolis Light & Heat Co. declined to provide, is being considered by Board of Public Wks. Contract for electric street lighting for ten years, beginning April 1, 1915, has been awarded to Merchants' Heat & Light Co.

Newton, Kan.—Installation of electric lights along west bank of creek from Broadway to dam is being discussed.

Cumberland, Md.—Want information regarding street conduits for wires, sewers, steam pipe, etc. R. L. Rizer, Asst. City Engr.

Fall River, Mass.—Aldermanic committee has made plans for installation of ornamental lamps on Morgan St.

Lunenburg, Mass.—Town has voted in favor of municipal electric distributing system to cost \$10,000.

Highland Park, Mich.—Installation of ornamental street lighting system is being considered. Electricity will be supplied by Edison Illg. Co. of Detroit pending construction of municipal electric light plant.

Lansing, Mich.—Bids are being received for constructing lighting equipment system according to specifications on file in office of Public Lighting Committee, 117 East Michigan Ave. B. A. Faunce is City Clerk.

Perth Amboy, N. J.—See "Water Supply."

Lestershire, N. Y.—Installation of new street lighting system is being discussed. Plans provide for erection of 155 lamps, and boulevard lamps on Main Street.

Niagara Falls, N. Y.—Bd. of Public Works has decided to extend ornamental lighting system on Main St. to Falls St., at cost of \$20,000.

Weedsport, N. Y.—Special election to submit proposal to issue \$18,000 in bonds for municipal electric-light system will be held May 4.

Springfield, O.—M. J. Bahin, city Engineer, will prepare plans for cluster lamp lighting system in central section of city.

Artesian, S. D.—Installation of electric lighting is being discussed.

Galveston, Tex.—Following bids have been received for electric cable which will be laid on Broadway from Twenty-first St. west for ornamental lighting which has been proposed: Southwest General Electric Co., Houston, for 24,780 ft. insulated wire cable, \$5,873; John A. Roebling Sons Co., of Trenton, N. J., on same cable bid \$236 per 1,000 ft. or \$5,846.08; American Steel Wire Association asked \$250 per 1,000 ft. or \$6,385; Standard Underground Cable Co., St. Louis,

bid 21.3 cents per ft. or \$5,078.14; Western Electric Co., Dallas, asked \$250.60 per 1,000 ft., which amounted to more than \$6,450. Bids were referred to City Engineer Dickey and City Electrician Master-son for tabulation and report.

CONTRACTS AWARDED.

Chicago, Ill.—For 30,000 ft. No. 6 B & S G rubber covered lead encased electric light cable to Simplex Wire & Cable Co., Chicago, at \$122.70 per M ft. Ray Palmer is Comr. Gas & Electricity.

Muscatine, Ia.—Council has approved of signing of contract with Muscatine Lighting Co. for street lighting, contract to run for 10 years.

Lawrence, Mass.—To Samuel Smith Machine Co., of this city, has been awarded contract to furnish eight column electric lights for new concrete bridge over Spicket River on Newbury St. Firm's bid was lowest of about 10 submitted and was \$29.50 for each light.

Fulton, N. Y.—Board of Public Works has accepted bid of Fulton Light, Heat & Power Co. on ten-year contract to light streets of city, commencing September 1. The ten-year contract accepted by board means that city will be supplied with light for streets at following rate: 80 candlepower lights, \$18.55 a year per light; 100 candlepower lights, \$20.50 annually, per light; 200 candlepower lights, \$28.25 annually per light; 350 candlepower lights, \$38.55 per light. Lights will be of tungsten type. City buildings will be lighted without charge.

FIRE EQUIPMENT

Greendale, Cal.—The Board of Trustees is discussing installation of electric fire-alarm system.

Los Angeles, Cal.—Installation of elaborate fire-alarm and police telegraph system is being considered. Safety commission consists of Councilman Snowden, Fire Chief Eley, Chief of Police Sebastian and City Electrician Manahan.

Los Gatos, Cal.—Town Board has called election to be held May 25 to vote on bond issue of \$10,000, of which \$6,000 is for purchase of motor combination chemical and hose wagon, and balance of \$4,000 for new station.

Bridgeport, Conn.—Purchase of tractors for fire trucks is being discussed.

Cincinnati, O.—See "Miscellaneous."

St. Petersburg, Fla.—Bids will be called for shortly on new fire truck.

Batavia, Ill.—Proposition to issue bonds for purchase piece of motor apparatus has been defeated.

Greenfield, Mass.—Town has decided to purchase 2,000 feet of hose. Philip Parthenheimer is Chief.

St. Joseph, Mo.—Council has decided to purchase one motor fire truck.

Midland Park, N. J.—Councilman Snyder has recommended purchase of piece of motor apparatus.

Newark, N. J.—Following are recommendations of annual report of Chief Paul T. Moore: The purchase of fire boat, extension of high-pressure water system, extension of fire prevention service, purchase of motor-driven water tower and purchase of three tractors for use on engines and trucks held in reserve.

Larchmont, N. Y.—Proposition to issue \$10,000 of bonds for motor apparatus will be voted on in near future.

Port Jervis, N. Y.—The Monticello fire department are contemplating putting in new fire alarm system.

Elyria, O.—Request has been made for tractor for 65-foot aerial truck. W. N. Bates is fire chief.

Girard, O.—Girard village council, in regular session, has passed ordinance providing for expense of constructing fire station and purchase of necessary equipment, which will no doubt include motor truck.

Erie, Pa.—See "Sewerage."

Lebanon, Pa.—Fire chief has asked for \$3,000 with which to install Gamewell alarm system; also for motor apparatus.

Williamsport, Pa.—Council is considering purchase of La France triple combination hose, chemical and engine.

Woodsdale, W. Va.—Bond election has been carried for purchase of fire truck.

Madison, Wis.—Council may advertise for bids for a motor combination chemical and hose wagon and auto for Chief Heyl.

Whitewater, Wis.—Purchase of one piece of motor apparatus is under discussion.

Port Coquitlam, B. C.—Council has authorized Fire Committee to purchase new apparatus to cost \$10,000.

CONTRACTS AWARDED.

Peabody, Mass.—Engineers have signed contract with Gamewell Fire Alarm Co. for reconstruction of fire alarm system in this town, work to be done by middle of July.

Nashua, N. H.—By Board of Fire Commissioners, contract to Seagrave Fire Truck people of Columbus, O., for Nashua's new auto combination chemical and hose.

Middletown, N. Y.—Mayor Cox has been empowered by Board of Estimate and Apportionment to enter into contract with Seagrave Manufacturing Co., of Columbus, for purchase of triple combination automobile pumping apparatus, as selected by committee, for the Waikill Engine Co. No. 6 of this city.

Syracuse, N. Y.—To Seagrave Co., of Columbus, O., contract for 6-cylinder, 100-h.p. motor combination chemical and hose wagon.

Toledo, O.—For motor aerial truck to American-La France Fire Engine Co., Elmira, N. Y., \$10,575. Other bids follow: Seagrave Co., Columbus, O., \$11,500; Jas. Boyd & Bro., Philadelphia, Pa., \$10,120.

Bloomsburg, Pa.—By Friendship Fire Co. to American-La France Fire Engine Co. for motor combination chemical and hose wagon.

Dallas, Tex.—Commission has approved contract with American-La France Co. to furnish city automobile fire pumping engine of 200 horsepower and capacity of 1,400 gallons per minute. This is largest engine made, and will cost city \$9,500. Engine is to be delivered in 120 days.

Galveston, Texas.—To American-La France Fire Brigade Co., of Elmira, contract for motor combination chemical and hose wagon, at \$5,500.

BRIDGES

Marysville, Cal.—City Council has formally decided to have new approach to Father River bridge provided with asphalt macadam floor 5 ins. in thickness.

Bridgeport, Conn.—Bond issue of \$400,000 has been voted for new Stratford Ave. bridge.

Bluffton, Ind.—County Council has appropriated \$2,700 for addition bridge construction work in Wells County. There also was made appropriation of \$850 for repairs on county jail.

Indianapolis, Ind.—Letter has been sent to Jacob P. Dunn, City Controller, by Board of Public Works, asking that Mr. Dunn recommend to City Council ordinance appropriating \$12,000 for construction of bridge across Pleasant Run at Minnesota St.

Logansport, Ind.—Bids are being received by Commissioners of Cass County for 80-foot concrete arch over Deer Creek in Deer Creek Township.

Salina, Kan.—Plans for a concrete bridge at Iron Ave., to cost \$30,000, for Salina County, have been prepared by County Engineer P. G. Wakenhut.

Harrison, N. J.—Resolution has been adopted by Harrison Town Council calling upon freeholders of Hudson and Essex counties to take immediate steps to build bridge over Passaic River from foot of Hunterdon street, Harrison, to Centre street, Newark, for wagon and pedestrian travel.

Connellsville, Pa.—Plans have been made for erection of two new bridges over Rassler's Creek, in Springfield township, and other over Champion run, in Saltlick township.

Ellwood City, Pa.—Plans are being prepared for Hazel Dell-Ellwood City bridge.

Dallas, Tex.—County auditor has been ordered to advertise for bids for construction of two 40-foot steel span bridges on crossroads in Commissioner C. D. Smith's district, in southern part of county, near Lancaster.

Smithville, Tex.—The \$50,000 in bonds which were voted in this precinct some time ago for construction of bridge across Colorado River at this place has been sold.

CONTRACTS AWARDED.

Columbia City, Ind.—Council will award contract for bridge over Blue River on May 18, to cost between \$5,000 and \$6,000. D. A. Walter is City Engineer.

Des Moines, Ia.—For highway bridge at S. W. 7th St. to Geo. W. Kass Constr. Co., Des Moines, at \$139,000. Horace Susong is City Clk.

Minneapolis, Kan.—By Board of County Commissioners of Ottawa County, to J. W. Weaver Const. Co., of Kansas City, Mo., for construction of reinforced concrete arch bridge over Pipe Creek, 80 ft. clear span, 13 ft. clear roadway, and 217 ft. open substantial concrete railing,

about 367.3 cu. yds. concrete and 13,791 lbs. steel reinforcement. Contract price, including removal of old structure, 360 ft. of wood piles and about 1,000 cu. yds. earth fill, \$5,748.

Sutherland, Neb.—To Lincoln Constr. Co., Lincoln, Neb., contract, at \$36,600, for reinforced concrete state aid bridge over N. Platte River. D. D. Price is State Engr., Lincoln.

Reidsville, N. C.—By Rockingham County Commissioners, contract to Virginia Bridge & Iron Co., Roanoke, Va., to construct bridge across Dan River near Berry Hill, between Rockingham County, N. C., and Pittsylvania County.

Hamilton, O.—By Butler County Flood Emergency Comm., for construction of viaduct and bridges over Great Miami River on levee road west of Middletown to Hackedorn Contr. Co., Indianapolis, Ind., at \$255,000. Arch construction, reinforced concrete throughout, arches from 70 ft. to 110 ft.

Doylestown, Pa.—Following bids have been received for making repairs to bridge over Watson Creek, on Old York road, in Buckingham township: David Sutton, \$1,017; Rigelsville Construction Co., \$1,442; Carl R. Camp, \$1,600. Contract was awarded to David Sutton. Following bids were received for erection of new bridge over Calhoun street, Morrisville: Whitaker & Diehl, \$12,844; Ferro Concrete Co., \$12,495; Carl R. Camp, \$10,400. Awarding of contract for this bridge was deferred.

Dallas, Tex.—By Commissioners' Court to Austin Bros., contract for erecting two 40-foot steel bridges on Willingham road, in western part of the county.

MISCELLANEOUS

Oakland, Cal.—City Council has adopted ordinance calling bond election on May 10, to decide upon the issuance of bonds amounting to \$710,000 for permanent municipal improvements. Total amount is divided into \$500,000 for completion of municipal auditorium, \$165,000 for erection of modern school to take place of recently burned Clawson school, and \$45,000 for acquisition of additional playground space.

Bridgeport, Conn.—Following bonding issues have been voted for and carried: \$300,000 for sewers, \$400,000 for new Stratford Ave. bridge, \$80,000 for high school completion, \$45,000 for high school equipment, \$200,000 for grade schools and sites, \$200,000 for bituminous macadam pavements.

Hartford, Conn.—Appropriations voted at city election were as follows: For land to be purchased from Connecticut River Bridge and Highway District, \$500,000; furnishing new municipal building, \$100,000; Homestead Ave. sewer, \$100,000; equipment of new high school building, \$40,000.

Chicago, Ill.—Bids for construction of freight and passenger buildings on city's recreation pier have been opened by Harbor and Subway Commission. Warner Construction Co., which bid \$1,067,984, was lowest, and Byrne Bros., with bid of \$1,499,000, were highest. These bids were based on steel foundations.

Litchfield, Ill.—City will purchase new street sweeper.

Indianapolis, Ind.—It has been decided that Board of Park Commissioners shall undertake building of retaining wall and boulevard along north bank of Fall Creek, from College avenue and 33d street, provided City Council will grant bond issue of \$40,000 to assist in defraying cost of wall. Mayor Bell and Board of Public Works, who, with Park Board, met the property owners, agreed that council should be asked to authorize bond issue of \$40,000. Cost of wall, it is estimated, will be from \$60,000 to \$75,000.

Muncie, Ind.—City will purchase new street roller.

Welsh, La.—There will be important election held throughout this parish May 26, called by parish police jury recently to secure vote on special tax for \$100,000 to provide for erection of courthouse, and \$25,000 for building jail.

Boston, Mass.—Port Directors have voted to adopt plans for new \$1,000,000 pier to be built on site of old Eastern Railroad Wharf in East Boston and to instruct their chief engineer to prepare specifications and call for bids to be opened on June 16.

Detroit, Mich.—Prices, etc., are desired by Geo. H. Fennell, Comr. Pub. Wks., for one squeegee street cleaning machine to be drawn by 2 horses for use on asphalt and creosoted block streets; also for one automatic adjustable sand spreader.

St. Joseph, Mo.—Council has voted \$576,300 appropriation for current year.

St. Joseph, Mo.—Council has voted \$10,000 for new city workhouse.

Dover, N. H.—Purchase of motor police ambulance of 28 h. p. has been authorized.

Plaistow, N. H.—Town will vote on purchase of stone crusher and motive power for same.

Perth Amboy, N. J.—Resolutions have been adopted awarding issue of \$123,000 worth of harbor improvement bonds to J. D. Everitt & Co.

South Orange, N. J.—H. J. Schnell, chairman of Park Committee, wants information about signs for parks.

Amsterdam, N. Y.—Commissioner J. B. Wright has asked Council for auto for use in his department at cost of \$550. He also has asked Council to purchase automatic street flusher, and bids will be advertised for same.

Fulton, N. Y.—A definite plan of action for proposed extension of Fulton Park system will be presented to Board of Public Works within few weeks.

Yonkers, N. Y.—Plans are being made for erection of city incinerating plant to cost about \$100,000. D. R. Dedrich is Chmn. Bldg. Com.

Cincinnati, O.—Solicitor has been directed to draw ordinances for issuance of \$241,000 worth of Fire Department bonds, \$60,000 for completion of Refuge Home, and \$50,000 for Police Station on Walnut Hills.

Elyria, O.—Request has been made for purchase of automobile patrol wagon.

Erie, Pa.—Director Baker, of Department of Finance, will introduce in council an ordinance authorizing bond issue for \$150,000. This will be for city parks, sewers and conduits. Additional ordinance may be introduced for \$22,000 for city hall improvements and purchase of aerial truck for Fire Department.

York, Pa.—New police call system will be constructed.

Sherman, Tex.—At called session of Sherman City Council, Secretary Henry Zimmerman was instructed to advertise for bids on improvement bonds in sum of \$100,000, recently voted. Date of sale was set at Monday, May 18.

Bristol, Va.—City is considering purchase of Garford 4-ton motor truck.

CONTRACTS AWARDED.

Quincy, Ill.—City Clerk Schroer has opened bids for dog tags. The Ottman Badge Co. offered to make and deliver 2,000 for \$25, and Klein Advertising Co. offered to have made and delivered 2,400 tags for \$24.40. Contract was awarded Klein Advertising Co.

Flint, Mich.—For supplying steam shovel contract was awarded to The Automatic Shovel Co., of Lorain, Ohio, at \$3,985; for six dump wagons to Studebaker Co., of South Bend, at \$100.94 each, and for two quick unloading chutes for use in unloading cars, to Thomas Roche, of Chicago, at \$30 each.

Brooklyn, N. Y.—Board of Estimate, on recommendation of Controller Prendergast has voted appropriation of \$2,225,519.25 for first section of Eastern Parkway subway, beginning at St. Mark's and Flatbush Aves., to Prospect Park Plaza. Contract has been awarded already to Cranford Co.

New York, N. Y.—For construction of Section No. 1 of Routes 4 and 38 of Seventh Ave. subway in Manhattan, to Rapid Transit Subway Construction Co., at \$2,121,077.

Schenectady, N. Y.—By Board of Contract for furnishing three street sweepers to Austin Western Road Machinery Co., at \$630.

Portland, Ore.—At special meeting of Commission of Public Docks, General Electric Co. was awarded contract for furnishing power equipment on Municipal Dock No. 1, bid being \$2,598.15. Other bidders were Allis-Chalmers Manufacturing Co., \$2,776.75, and Westinghouse Electric & Manufacturing Co., \$2,836. Timms-Cress Co. was awarded contract for supplying and installing three fire doors on central fire wall of dock for \$635. James G. Wilson Manufacturing Co. bid \$635.74.

Lewistown, Pa.—To Enoch Miller, of Mifflinburg, contract for repairs to court house at \$6,883.

Burlington, Vt.—Bids were opened at Richford by Architect Frank L. Austin for construction of new town hall. Contract was awarded to J. J. Colcord of Richford for \$17,000.

Norfolk, Va.—Bids have been opened by Col. E. E. Winslow, U. S. A., engineer in charge of this district, for dredging in Norfolk-Beaufort link of inland waterway. There were eight bidders, lowest being the Bowers Southern Dredging Co., of Galveston, Tex., who proposed to do work at 6.9 cents a cubic yard. Dredging embraced in contract is approximately 2,000,000 cubic feet.